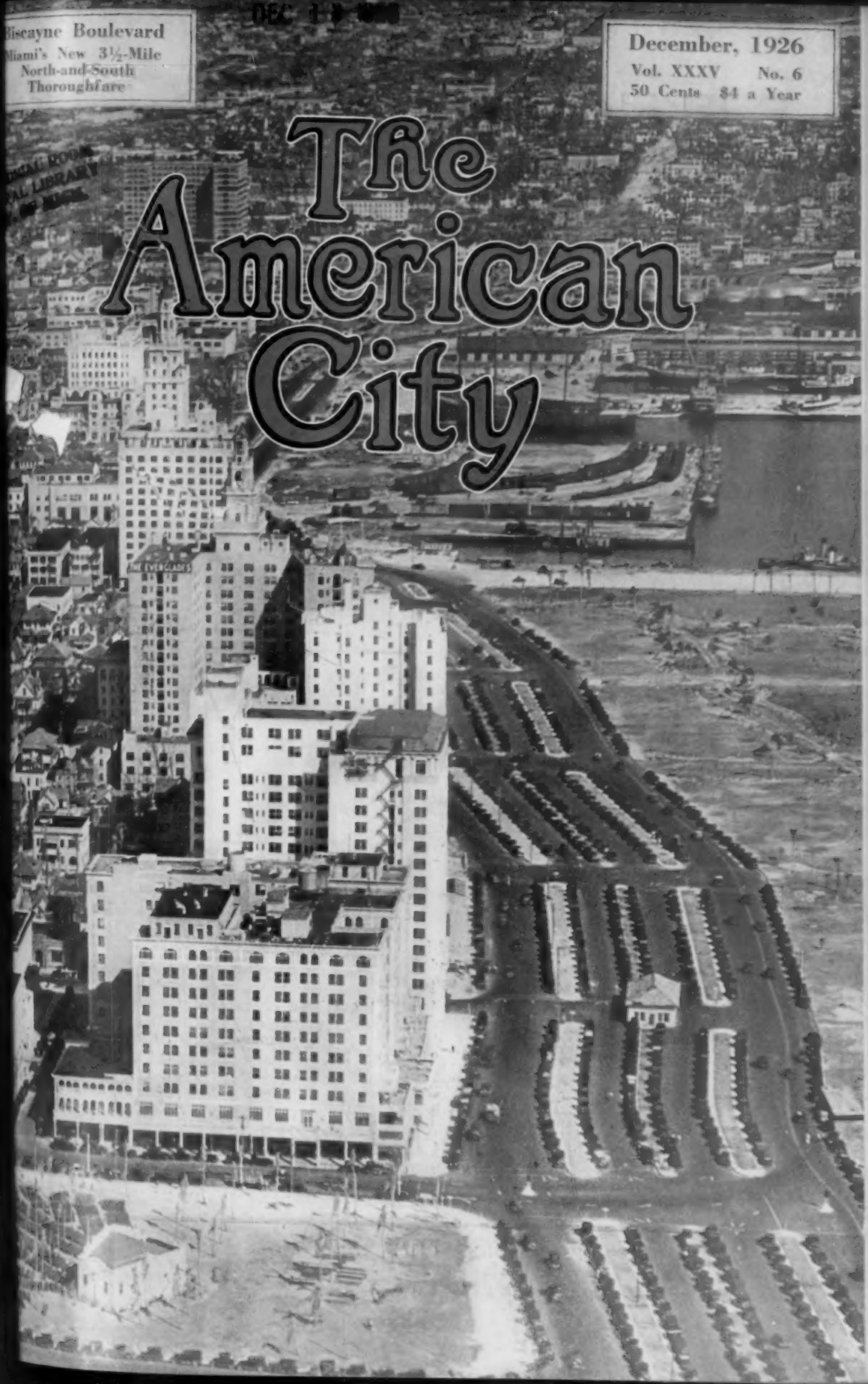
DEC 1 ●

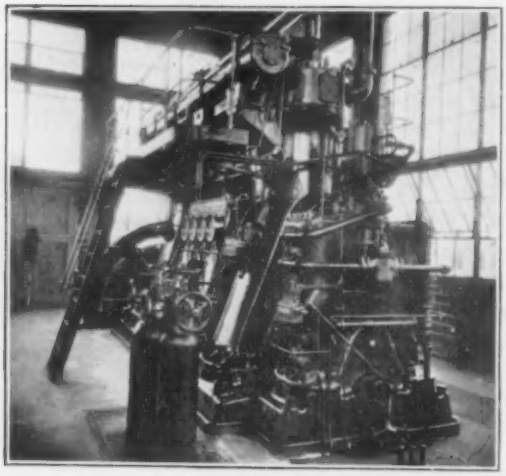
Biscayne Boulevard
Miami's New 3½-Mile
North-and-South
Thoroughfare

December, 1926
Vol. XXXV No. 6
50 Cents $4 a Year

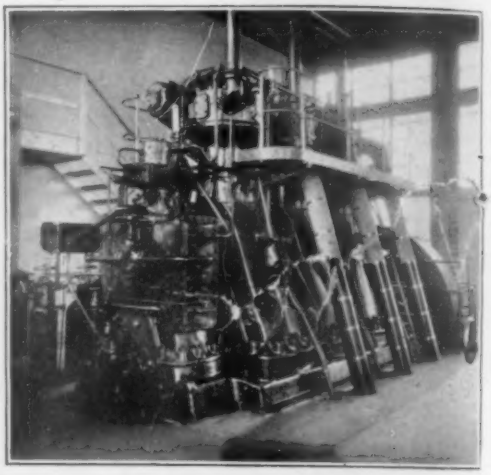
The American City



FULTON DIESEL



300-B.H.P. Fulton-Diesel direct connected to Generator



400-B.H.P. Fulton-Diesel direct connected to Generator.

Hawarden, Iowa, Municipal Plant

Cuts Fuel Bill 81 Percent

The City of Hawarden, Iowa, operated its Fulton-Diesel plant during the year ended March 31st, 1926, at a cost of $4,142.18 for fuel oil. The annual coal bill for the old steam plant which the Fulton-Diesel equipment replaced averaged $22,239.98 during the preceding four years,—or a saving in favor of the Fulton-Diesel of $18,097.80 per annum.

In fact, the entire cost of operating the Fulton-Diesel plant for the year, including all overhead charges, depreciation allowance, insurance, etc., was slightly more than one-half the amount of the steam plant's coal bill alone.

Fulton-Diesel installations have a history of economical and dependable operation. We welcome the opportunity of giving you complete details of the many distinctive features of the design which has made this unit so outstandingly successful. May we send you a copy?

FULTON IRON WORKS COMPANY, ST. LOUIS, U. S. A.

SUCCESSFUL ENGINE BUILDERS FOR OVER SEVENTY YEARS

BRANCH OFFICES:

New York—82 Wall St. Dallas, Texas—Praetorian Building Havana, Cuba—415-416 Manzana de Gomez

VOL. XXXV. No. 6 THE AMERICAN CITY, December, 1926 Price, 50 Cents; $4 a Year

Entered as second-class matter, April 16, 1923, at the Post Office at New York, N. Y., under Act of March 3, 1879

Issued Monthly by The Civic Press, 443 Fourth Ave., New York. Printed in U. S. A.

Index to Contents of This Issue, Page 79

In laying deLavaud Centrifugal pipe, the plain end slides forward, riding on the tapered shoulder inside the bell until it automatically centers itself.

deLavaud Centrifugal pipe is self-centering—easy to lay

THIS pipe is equipped with bell and plain end joint similar to the type used by the Metropolitan Water Board of London, England. Once in place and caulked in the usual manner, these joints show unusual resistance to blowing out and are most flexible.

Write for literature covering the specifications and use of deLavaud Centrifugal Cast Iron Pipe

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia, Chicago, Birmingham, Buffalo, Cleveland, New York, San Francisco, Pittsburgh, Dallas, Kansas City, Minneapolis

Index to Advertisements in this issue, Page 146

CATALOGS FOR CITY OFFICIALS

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free of charge. Officials who check over these items each month and write for such printed matter as interests them will find this a convenient way of keeping their information files up to date.

A NON-POISONOUS WEED KILLER

Atlas non-poisonous weed killer, which is absolutely safe and which positively will not injure human beings or animals, nor stain clothing or footwear, is described in Booklet E which may be secured from the Chipman Chemical Engineering Co., Inc., Bound Brook, N. J.

FIRE-HOSE THAT IS DEPENDABLE

Dependability counts among fire lines where life and property depend on the efficient functioning of the fire department and on good hose. Information on Paragon and the other famous brands of Eureka fire-hose may be secured from the Eureka Fire Hose Mfg. Co., 50 Church St., New York.

DIESEL ENGINES THAT CONVERT LOSSES INTO PROFITS

Bulletins describing the service of the Fulton-Diesel engine, which has converted losses into profits in many municipal power-plants, may be secured from the Fulton Iron Works Co., St. Louis, Mo.

A MOTOR CATCH-BASIN CLEANER

The Auto-Eductor, a catch-basin cleaning unit which does away with the objectionable features of catch-basin cleaning and which cuts the cost of catch-basin cleaning over hand labor, is described completely in an illustrated folder which may be secured from George C. Dodge, President, Elgin Sales Corp., 501 Fifth Ave., New York.

A FREE MANUAL ON WATER PURIFICATION

The American Steel & Wire Company's manual on water purification may be secured by any interested water-works officials without cost by writing to B. B. Ayers, American Steel & Wire Co., 208 South La Salle St., Chicago, Ill.

A NEW AND FLEXIBLE JOINT FOR WATER-MAINS

The Victualic Company of America, 26 Broadway, New York, will be pleased to send its literature describing the Victaulic joint for cast-iron and other pipe used in water-mains to any interested water-works officials.

ACTION PHOTOGRAPHS OF CRAWLER TRACTORS

The Full-Crawler Co., 518 Clinton St., Milwaukee, Wis., in its new folder, "For Extra Fordson Power," explains and shows by sketches and photographs the construction of various parts of the Trackson Full-Crawler and the advantages of such construction. Sixteen action photographs show the Trackson-Fordson performing various kinds of work in the municipal and contracting fields.

CURING AND HARDENING CONCRETE ROADS

The Grasselli Chemical Co., Cleveland, Ohio, has issued an illustrated and instructive 18-page booklet describing the use of Grasselli silicate of soda for curing and hardening concrete roads. This material has been in use in many parts of the country with satisfactory results for many years.

A UNIVERSAL PIECE OF PLAYGROUND APPARATUS

The Junglegym, which is constructed of specially-selected smooth steel tubing galvanized inside and out by the hot process, and which supplies a climbing unit of various sizes for playgrounds, is described completely in literature which may be secured from the Playground Equipment Co., 342 Madison Ave., New York.

REDUCING THE COST OF MUNICIPAL STREET CLEANING

The Austin-Western Road Machinery Co., 400 N. Michigan Ave., Chicago, Ill., has just issued an illustrated catalog on municipal street cleaning which contains an interesting and helpful discussion of the modern conception of the value and importance of clean streets and of the serious problems created by this conception. This catalog also contains a description of the Austin motor pick-up sweeper, its design and construction, with typical operating facts and figures.

TRAFFIC SIGNALS AND CONTROL APPARATUS

The reasons why the Essco Mfg. Co., Peoria, Ill., received the Oakland, Calif., award for 56 traffic signals and controlling apparatus and why other cities award their contracts to Essco, will be found on examining the catalog of this company, which may be secured free on request.

LOCATE LEAKS PROMPTLY AND SAVE MONEY

The portable Geophone, which has saved many hours of needless excavation in frozen ground in more than one city and which is so built that it is possible to detect the smallest leak with great accuracy and speed, is described in the catalog of the Empire Electric & Water Co., Inc., 452 Lexington Ave., New York.

VITRIFIED SALT-GLAZED CLAY METER-BOXES

Dickey meter-boxes, made of vitrified salt-glazed clay, which does not rot, rust, decompose, or disintegrate, giving permanent protection to meters from frost and making it simple to read or change meters, are described in the illustrated catalog and price list of the W. S. Dickey Clay Mfg. Co., Kansas City, Mo.

A PROTECTIVE PAINT FOR EXPOSED METAL OR WOOD WORK

Dixon Silica-Graphite paint, judged by the cost per year of service, has proved most economical for the protection of all exposed metal and wood work. The longevity of this paint, due to the wear-resisting pigment, flake silica-graphite, and the vehicle, pure boiled linseed oil, is given in the form of concrete records in Booklet 148-B which may be secured from the Joseph Dixon Crucible Co., Jersey City, N. J.

MAPS AND CHARTS OF THE UNITED STATES GOVERNMENT

W. & L. E. Gurley, Troy, N. Y., have published a Bulletin, M-502, which tells how the maps and charts of the United States Government are made and where they may be obtained. Free copies of this Bulletin, which is published by the permission of the Board of Surveys and Maps of the Federal Government, may be secured from Gurley.

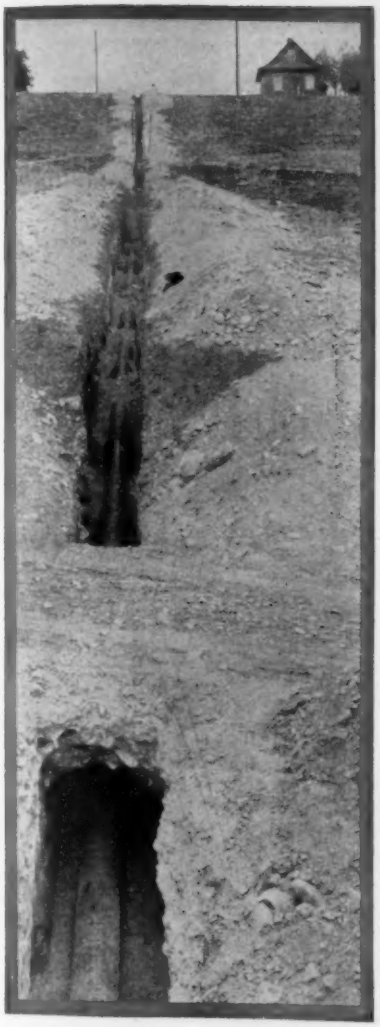
COMPLETE DATA ON THE USE OF EXPANSION JOINTS IN CONCRETE ROADS

An interesting 72-page book which contains as much, if not more, information on expansion joints in concrete roads than any text book which you would buy, is available for free distribution to readers of The American City upon application to the Philip Carey Co., Lockland, Cincinnati, Ohio.

BETTER ROADS BETTER MAINTAINED

Motorists and taxpayers have learned that ruts and bumps are avoidable. They have discovered the greater comfort of driving over roads built and maintained by Caterpillar equipment. Just how Caterpillar tractors can serve you better, quicker, and cheaper in the construction and maintenance of your roads, thus stretching public funds over more miles of good roads, will be found in the literature of the Caterpillar Tractor Co, San Leandro, Calif.

See additional items on pages 6-8-10



Mono-cast Pipe Is Economical

Frequently the largest item in a construction program is the cost of the pipe. Therefore the economies possible with the use of Acipco Mono-cast Centrifugal pipe are very much worth while.

In equal weights and metal thickness, Mono-cast is delivered on your job one to three cents per foot less in cost than old style sand-cast pipe.

In the lighter weights (good for higher working pressures) Mono-cast, delivered along your trench, will save you 10 per cent to 15 per cent in cost alone.

Mono-cast Specifications mailed on request. Write for a copy.

AMERICAN CAST IRON PIPE COMPANY
BIRMINGHAM, ALA.
DISTRICT OFFICES IN PRINCIPAL CITIES

ACIPCO MONO-CAST CENTRIFUGAL PIPE
BELL AND SPIGOT

MONO-CAST MEANS MADE AS A UNIT—AN INTEGRAL CASTING. EVERY PART OF MIRROR IS FORMED AT THE SAME MOMENT BY CENTRIFUGAL FORCE

"Mono-cast" is the trade mark of the American Cast Iron Pipe Company

CATALOGS FOR CITY OFFICIALS

You can secure any or all of these catalogs free of charge if you mention The American City

THE ADVANTAGES OF COPPER AND BRASS SERVICE PIPE

Among the advantages of copper and brass service pipe are: it minimizes corrosion, outlaws rust clogging, is easy to install, needs no replacing, necessitates no costly repaving, and is the cheapest in the long run because of lasting service. No charge is made for consulting the Technical Department of the Copper and Brass Research Assn., 25 Broadway, New York, which will be pleased to send data to any interested municipal officials on service pipe problems free on request.

OLD PAVEMENTS THAT ARE EVER NEW

Trinidad native lake solid bitumen, which is superior in every way to man-made substitutes for heavy traffic pavements, of which there are hundreds that have been in service for nearly two decades and are still new, is described in the Bermudez road asphalt book, which contains interesting data. Write to the Barber Asphalt Co., Philadelphia, Pa., for a copy.

DIESEL-DRIVEN POWER-PLANTS

A small, individually owned diesel-driven or current generating plant right on the spot, has no exposed transmission lines to break down from accident or storm. The service records and economy of McIntosh-Seymour diesel engines for municipal power-plants is told in an interesting and helpful manner in the literature of the McIntosh & Seymour Corp., Auburn, N. Y.

SANITARY ENGINEERING EQUIPMENT

The latest Sanitary Engineering Bulletin of the Dorr Co., 247 Park Ave., New York, discusses in a helpful way the application of Dorr equipment to sanitary engineering problems, such as the treatment of municipal sewage, the purification and softening of water-supplies, and the treatment of industrial waste waters.

RUSTLESS FENCING

A fencing which has the three most desired requisites of a fence—protection, beauty, and freedom from maintenance costs—has been developed by the Copperweld Steel Co., Braddock Post Office, Rankin, Pa., in its Copperweld chain-link wire fencing, barbed wire and farm fencing. The wire consists of a sheet of copper, making up more than 30 per cent of the wire's volume, permanently and continuously welded to a steel core.

HARDY NURSERY STOCK

The Kelsey-Highlands Nursery, Harlan P. Kelsey, proprietor, Salem, Mass., will be pleased to furnish municipalities with its 1926 Catalog listing hardy plants, rhododendrons, and azaleas, Carolina Mountain flowers, specimen evergreens, and rare plants for municipal parks and grounds.

VALVES FOR FILTRATION PLANTS

Descriptive matter which may be secured from the Michigan Valve & Foundry Co., Detroit, Mich., describes this company's valves, which are incorporated in the larger filtration plant installations in the United States, as well as their complete line of water-works systems and filtration and sewerage plants.

CAST IRON WATER AND GAS PIPE

The National Cast Iron Pipe Co., Birmingham, Ala., will be glad to send literature and prices regarding National sand cast, and de Lavaud centrifugally cast, cast iron water and gas pipe, as well as fittings, flange pipe, and special castings.

DIFFUSER PLATES FOR ACTIVATED SLUDGE PLANTS

Full information regarding Filtros diffuser plates, which are frequently specified by engineers in designing activated sludge plants, may be secured from the General Filtration Co., Inc., Cutler Bldg., Rochester, N. Y.

PUMPS FOR ALL SERVICES

Gould pumps, of which there is a type for every service, are described in the Bulletins of Gould's Pumps, Inc., Seneca Falls, N. Y., which this company will be pleased to send to interested officials on request.

TAR HEATERS BUILT FOR SERVICE

Honhorst tar heaters, which are "built for service" in all styles, portable and stationary, and in sizes from 25 to 200 gallons, are described in the catalog which may be secured on request from the Jos. Honhorst Co., 1016 W. 6th St., Cincinnati, Ohio.

WATER-TIGHT JOINTS THAT WILL NOT LEAK

Lead-Hydro-Tite is a black powder, not injured by age or dampness, which forms a hard, metallic, tight joint when melted and cooled. Just how this makes a water-tight joint that will not leak no matter how far a pipe may settle, is described in the literature of the Hydraulic Development Co., 296 Boylston St., Boston, Mass.

MOWING PARKS AND GOLF COURSES

Ideal Bull Dog gang mowers for the care of large park areas and golf fairways, which are simple in design and of sturdy construction, as well as the complete line of Ideal power mowing equipment, hand mowers, putting-green mowers, golf carts, and other golf and park accessories, are described in the large catalog of the Ideal Power Lawn Mower Co., 400 Kalamazoo St., Lansing, Mich., which may be secured on request.

AIR-LIFT PUMPS

The literature of the Indiana Air Pump Co., Indianapolis, Ind., which will be sent free on request, describes this company's Economy air-lift pumps, which greatly increase the yield of old wells, clean out wells, handle gritty water perfectly, are simple in construction, have no valves nor moving parts, and are easy to install.

GRAVITY FILTRATION PLANTS

The International Filter Co., 333 W. 25th Pl., Chicago, Ill., will be pleased to send to interested officials its literature on water-softening and filtration plants for cities.

MORE WATER AT LESS COST

If you have a water-supply problem to solve, write to the Kelly Well Co., Grand Island, Nebr., for information and prices on Kelly concrete wells, which it is claimed furnish more water at less cost.

DEEP-WELL PUMPS

The latest catalog of the Keystone Driller Co., Beaver Falls, Pa., which this company will be glad to send to interested municipal officials on request, describes Downie deep-well pumps, one of which has been in service in Newtown, Pa., since 1892 and is still in daily use.

MACHINE FOR MARKING TRAFFIC LINES

The Line-O-Graph highway marking machine, which is operated by one man, does away with brushes, eliminates all hand-painting, marks with any kind of highway paint, and makes perfect lines on any paving for dangerous curves, safety zones, parking spaces, and street crossings, is described in literature which the Line-O-Graph Co., 17 E. 42nd St., New York, will be glad to send on request.

REINFORCED CONCRETE PIPE

Newark reinforced concrete pipe, which it is claimed has the cheapest form of joint to lay properly, is described completely in the literature of the Newark Concrete Pipe Co., 462 Broad St., Newark, N. J., and may be secured by writing to this company.

ROCK ASPHALT FROM KENTUCKY

Information regarding Bituroc Kentucky rock asphalt, which is economical, durable and practical, may be secured by interested officials from the Ohio Valley Rock Asphalt Co., 517-18 Starks Bldg., Louisville, Ky.

GRASS FOR PARKS AND GOLF COURSES

Two interesting booklets, "The Seeding and Care of Lawns" and "Bent Lawns," may be secured from O. M. Scott & Sons Co., Marysville, Ohio. These booklets tell you how to secure beautiful, weed-free grass for parks, golf courses, athletic fields, and playgrounds through the use of Scott's pure seed.

SEWAGE DISPOSAL PLANT EQUIPMENT

The Pacific Flush-Tank Co., 4241 E. Ravenswood Ave., Chicago, Ill., publishes nine catalogs on sewer-flushing siphons, sewage ejectors, sewage pumps, sludge pumps, flush-tank water regulators, sewage disposal apparatus, and Imhoff tanks, and will be glad to send full information regarding its products to anyone interested.

CHEMICALS FOR WATER PURIFICATION AND SEWAGE TREATMENT

Liquid chlorine, chloride of lime, and sulphate of alumina for water purification and the treatment of sewage, which may be secured in single-unit tank cars, multi-unit tank cars, or 150-pound cylinders, are described in the literature of the Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

See additional items on pages 4, 8 and 10

MATHIESON Chemicals

Beating the Market

ON basic commodities such as Mathieson products, market price bears a definite relation to cost of production and distribution, with a fair return to the producer.

If a manufacturer can afford to go below a fair market price for his product, it is time for the discriminating buyer to wonder why and to make certain that the service he is being offered will measure up to his exacting standards. Someone must pay the difference in price in such cases; it is usually the buyer who pays it in the end and often many times the amount.

Mathieson products are merchandized on the sound basis of quality and superior service—to buyers who may have tried the doubtful economy of "beating the market."

The MATHIESON ALKALI WORKS *Inc.*
250 PARK AVE. NEW YORK CITY
PHILADELPHIA CHICAGO PROVIDENCE CHARLOTTE

Caustic Soda ~ Liquid Chlorine
Bicarbonate of Soda
Anhydrous Ammonia

Soda Ash ~ Bleaching Powder
Modified Virginia Soda
Aqua Ammonia

Deal Direct with the Manufacturer

CATALOGS FOR CITY OFFICIALS

You can secure any or all of these catalogs free of charge if you mention The American City

FIRE-ALARM AND POLICE SIGNAL SYSTEMS

The Garl fire-alarm system, which is claimed by the manufacturer to be the last word in simplified fire-alarm signal practice, is described completely in an illustrated colored folder which the Garl Signal Co., Akron, Ohio, will furnish to municipal officials free on request.

EASILY TRIPPED SUPPORT INSURES PERFECT SEWER JOINTS

The G-K Sales Agency, Macungie, Pa., will be pleased to send complete directions for using a device which when used with G-K joint compound insures a water-tight root-proof joint in salt-glazed vitrified clay pipe, even when the joints are poured in wet trenches.

A STREET SWEEPER AND SNOW BROOM

The Detroit street sweeper and snow brush, which has a sweeping surface approximately 5½ feet wide and which will sweep dirt, refuse, sawdust, shavings, metal borings, and other light material and will handle snow 10 to 12 inches deep, is described in the literature of Whitehead & Kales Co., Detroit, Mich.

LARGE-DIAMETER CULVERTS

Armco culverts are now made in diameters from 60 to 108 inches, offering an easier and better way to bridge small streams. Complete information regarding design and installation may be secured from the Armco Culvert & Flume Mfrs. Assn., Middletown, Ohio.

A NEW SNOW-PLOW FOR MEDIUM-WEIGHT TRACTORS

The new Acme snow-plow attachment for use with McCormick-Deering tractors has a V-shaped plow in front which rolls the snow away, and side adjustable wings which make it possible to clear the highway the full width or to level off the tops of the banks to permit further piling of the snow. Complete information may be secured from the Acme Road Machinery Co., Inc., Frankfort, N. Y.

DEPENDABLE CENTRIFUGAL PUMPS

The Aldrich Pump Co., No. 3 Gordon St., Allentown, Pa., will be pleased to send its Data Sheets 70 and 71 regarding its single- and double-suction, single-stage and multi-stage centrifugal pumps to any interested officials on request.

300,000 MILES AND MORE

This is the title of a new booklet just issued by the White Co., Cleveland, Ohio, with the names of all the owners and the number of Whites each owns in each mileage classification. Write for a copy of this booklet, which will be sent free on request.

ARCHERY—A NEW PLAYGROUND SPORT

The folder of the Archers Co., Pinehurst, N. C., describing this company's complete line of strong, pliable bows and attractive straight-shooting arrows, made by experts, which are well suited for use in playgrounds, will be sent free upon request.

FIRE-HOSE THAT WILL NOT CRACK OR LEAK

Bi-Lateral fire-hose construction keeps the rubber from cracking or leaking. If you want the best fire-hose at the lowest cost per year of service, send for the catalog of the Bi-Lateral Fire Hose Co., 230 W. Randolph St., Chicago, Ill.

DOUBLE-STROKE, DEEP-WELL POWER PUMPS

If you are interested in deep-well pumps, write for the descriptive catalogs of the United Iron Works, Inc., Kansas City, Mo., which describes this company's "Pomona" double-stroke, deep-well power pumps.

A SUPERHEATER FOR REPAIRING ASPHALT PAVEMENTS

The Greco pavement superheater, whereby old asphalt pavement is softened in place, allowing the surface to be easily scraped off while hot and soft, at which time new material is added to the clean, hot surface, giving a welded wearing surface, is described in literature which may be secured from the Good Roads Equipment Corp., City Centre Bldg., Philadelphia, Pa.

LIFE EXTENSION SERVICE FOR YOUR CITY'S WATER-SUPPLY

The Pitometer Co., 52 Church St., New York, will be pleased to send you literature describing the service of Pitometer engineers in discovering little leaks in the water-works system which may lead to serious losses later on.

MOTOR AND STEAM ROAD ROLLERS

The Buffalo-Springfield Roller Co., Springfield, Ohio, has just issued a new 45-page illustrated catalog on Buffalo-Springfield steam and motor rollers and Kelly-Springfield steam rollers for every roller service in road work.

PIPE FOR WATER AND POWER PLANTS

"Michigan" water pipe, which is economical and durable for use on water-works supplies and by power and manufacturing plants, is described in the catalog of the Michigan Pipe Co., Bay City, Mich.

IRON PIPE RAILINGS

If you are in the market for pipe railing for stairs, bridges, or retaining walls, send your drawings to the Pipe Railing Construction Co., Long Island City, N. Y., which will be glad to quote prices that will be worth considering.

TREES AND SHRUBS FOR PARK AND CEMETERY PLANTING

Pontiac Nurseries, 204 Architects Bldg., Detroit, Mich., will be pleased to mail you a copy of their new "Planting Guide" and will quote special prices on trees, shrubs, and evergreens to park and cemetery superintendents and other buyers for civic plantings.

ASH COLLECTION WAGONS

The Rex-Watson Corp., Canastota, N. Y., manufacturers of Watson ash wagons, will be pleased to send information and prices regarding their products to interested officials on request.

FREE CATALOG ON STREET SIGNALS, STANDARDS, AND PARKING SIGNS

A free copy of the handsome catalog of the Rochester Street Signal Co., 400 Ward Bldg., Rochester, N. Y., on street signals, standards, and parking signs, is yours for the asking.

PLANS FOR PARKS AND CEMETERIES

An illustrated catalog on ornamental trees, shrubs, roses, evergreens, etc., as well as choice grass seeds of absolute purity, will be sent on request by the J. Otto & Son Nursery Co., Dept. A. C., 143 Nichols St., Rochester, N. Y., which will also submit free practical plans for parks and cemeteries without obligation.

FIRE, POLICE AND TRAFFIC UNIFORMS

M-L quality-built uniforms for policemen, firemen, and traffic officers are made by the Maier-Lavaty Co., 2143-45 Lincoln Ave., Chicago, Ill., from which descriptive catalogs and samples may be secured.

BADGES FOR ALL PURPOSES

The fully illustrated catalog of the C. G. Braxmar Co., Inc., 242 W. 55th St., New York, tells all about Braxmar badges, which are made in all metals for police, fire and other municipal uses.

DIESEL ENGINES FOR MUNICIPAL PLANTS

If you are interested in diesel engines for municipal plants, send for the Bulletins of the Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo., which describe these engines and list the many cities which have recently purchased them.

VALVES OF ALL DESCRIPTIONS

Complete information and prices on Coldwell-Wilcox flap and drain valves, plug valves, sluice-gates and shear valves, may be secured without obligation from the Coldwell-Wilcox Co., Water St., Newburgh, N. Y.

TREES, SHRUBS AND ROSES

The Cole Nursery Co., Painesville, Ohio, will be pleased to send park and cemetery officials its latest catalog of trees, shrubs, and roses for park, cemetery, and private estate planting.

VALVES AND HYDRANTS

Estimates on Columbian valves and hydrants, which are bronze-mounted, simple in construction, rugged, reliable, and easy to handle, as well as on its complete line of valve-boxes, sluice-gates, meter-boxes, and other water-works supplies, will be promptly furnished by the Columbian Iron Works, Chattanooga, Tenn.

REPRODUCTIONS OF TRACINGS, MAPS, AND PLANS

Bulletins describing Lithoprints, which are ink reproductions of tracings, maps, and plans on any kind of material and which look like a lithograph and cost like a blueprint, will be furnished free on request by the Lithoprint Co. of N. Y., Inc., 41-43 Warren St., New York.

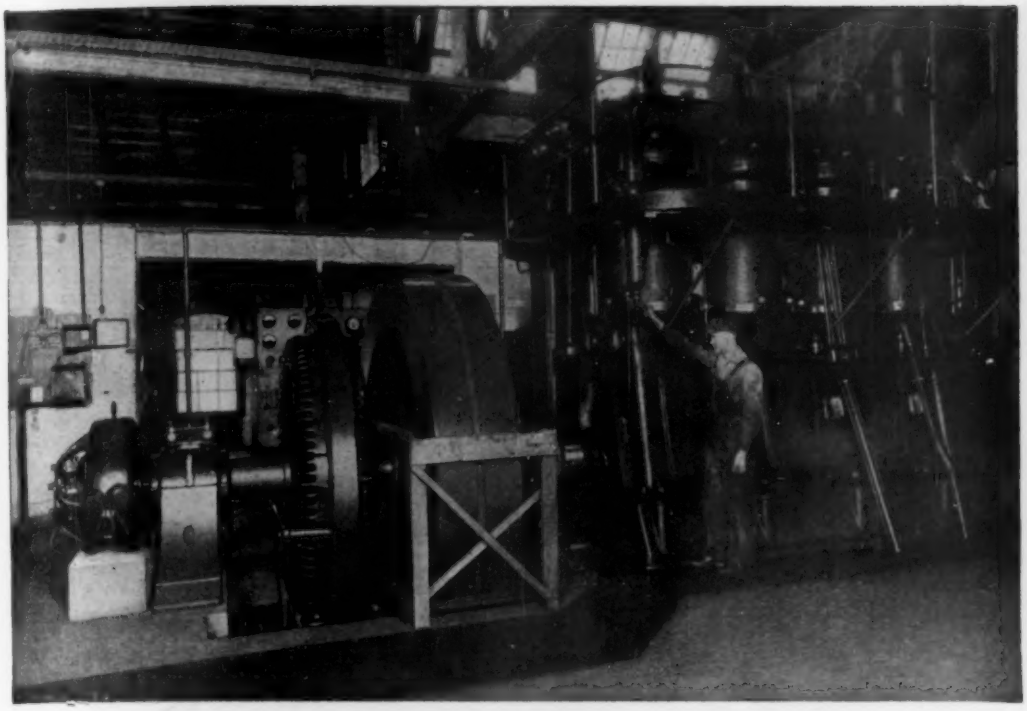
MUNICIPAL GARBAGE INCINERATORS

An illustrated catalog describing the Decarie incinerator, which is its own power-plant, making it unnecessary to purchase electric power, will be sent on request by the Decarie Incinerator Co., 342 Madison Ave., New York.

CAST IRON PIPE FOR WATER AND GAS

Complete information and price lists will be sent on request by the Donaldson Iron Co., Emaus, Lehigh Co., Pa., manufacturers of cast iron pipe for water and gas lines, as well as special castings and flange work.

See additional items on pages 4, 6 and 10



81 per cent reduction in the fuel costs by converting from steam to Diesel power

A LONG ISLAND lighting plant where coal is expensive and labor is hard to get, in one month generated only 37,000 kw-hr. and consumed $1,500 worth of coal. Fuel and ash handling was also a big item and the engineers were dissatisfied because the irregular labor supply sometimes made it necessary for them to tend fires and punch flues and do other fireman's jobs.

By replacing steam with the above 300-b.hp. Diesel plant, the fuel cost for generating 40,000 kw-hr. in a month was reduced to $308. Labor costs also were materially lessened and the labor problem was simplified.

At times of excessive peak load, the old steam plant is operated for additional power, but even then the greatest possible portion of the load is put on the Diesel engine for the good reason that best economy is so effected. In a typical month, the steam reserve produced only 6020 of the total 83,240 kw-hr. generated.

If your steam generating costs are too high, and a Diesel engine would afford relief, let us tell you why and how much.

By Invitation Member

McIntosh & Seymour Corporation

Main Offices and Works: AUBURN, NEW YORK

New York City — Kansas City, Mo.
Jacksonville, Fla. — Houston, Tex.
San Francisco

McINTOSH & SEYMOUR DIESEL ENGINES

CATALOGS FOR CITY OFFICIALS

You can secure any or all of these catalogs free of charge if you mention The American City

A WATER-METER THAT GIVES GENUINE SERVICE

The results of tests and service records of "Watch Dog" water-meters will be found in the literature of the Gamon Meter Co., Newark, N. J.

DOES YOUR TOWN NEED MODERN HOTEL FACILITIES?

If your community needs more modern hotel facilities, you should ask the Hockenbury System, Inc., Harrisburg, Pa., for copies of the *Financialist*, a journal on community hotel financing. Write and ask that your name be placed on List A9, which brings this service to readers of The American City without obligation.

DEPENDABLE PLAYGROUND APPARATUS

The EverWear Mfg. Co., Springfield, Ohio, will be glad to send the attractive, illustrated EverWear Catalog describing this company's complete line of swings, slides, ladders, and other playground equipment, free on request.

SIMPLE, ACCURATE, DURABLE WATER-METERS

Federal meters, which have large-capacity registers, extra-heavy oil-enclosed gear train which can be lubricated without removal from the meter, breakable cast-iron bottom, and measuring chamber of ample dimensions, and which are made in ⅝-, ¾-, 1-, 1½-, and 2-inch sizes, are described in literature which may be secured from the Federal Meter Corp., East Orange, N. J.

TREES, SHRUBS, AND EVERGREENS

If you are interested in ornamental trees, shrubs, and evergreens for street and park planting, you should secure the literature of the Framingham Nurseries, Framingham, Mass.

TRAFFIC CONTROL FOR THROUGH STREETS

The A. G. A. Company, through its Traffic Engineering Division, Elizabeth, N. J., has issued a bulletin, "Stop—Through Traffic," which tells how any city can make its main thoroughfares express streets for through traffic by the use of A. G. A. traffic equipment.

A ONE-MAN GRADER FOR VARIED SERVICES

The Hadfield-Penfield one-man grader, which speeds your work and saves in cost for building and maintaining roads, grading, scarifying, rooting, rolling, ditching, and snow removal, is described completely in the literature of the Hadfield-Penfield Steel Co., Bucyrus, Ohio.

THE LATEST IMPROVED OIL-BURNING KETTLE

The new Connery Style-J oil-burning kettle, in which the inside tank is so constructed that the hot and cold materials are separate, is completely described in the recent literature of Connery & Co., Inc., 4000 N. Second St., Philadelphia, Pa.

WELDED STEEL FABRIC FOR IMMEDIATE DELIVERY

There is no need of holding up your gang or risking an early winter. Order your welded steel fabric now and avoid shutdowns and carrying work over. The National Steel Fabric Co., 709 Union Trust Bldg., Pittsburgh, Pa., the world's largest manufacturer of welded steel fabric, can meet requirements now, whether large or small, and will be pleased to send complete information regarding deliveries and National welded steel fabric on request.

A BALANCED GRADER WITH HIGH LIFT

The new Rome grader built in 6-, 6½-, 7-, 8-, 9-, 10-, 11-, and 12-foot sizes, with high-lift, bottom-socket joints and a steering device similar to that on automobiles, and a telescoping pole which doubles the strength of the connecting unit when a tractor is used, is completely described and illustrated in the literature of the Rome Mfg. Co., Locomotive Dept., Rome, N. Y.

THE EFFECT OF ADMIXTURES ON CONCRETE

Bulletin 325 issued by the Celite Products Co., 1320 S. Hope St., Los Angeles, Calif., contains considerable technical material on the effect of silicious admixtures in increasing the workability of concrete mixes and improving the uniformity and water-tightness of the resulting concrete. The Bulletin, which may be secured free on request, also gives directions for the use of Celite, including the percentages recommended for various concrete mixes. It brings out the importance of keeping the water content at the lowest possible minimum in order to secure concrete of maximum strength, and explains why Celite makes it possible to place concrete at dryer consistencies than could be employed with plain concrete.

RESPONSIVE MOTORS FOR MAINTENANCE EQUIPMENT

Responsive power for the day's work, whether it be in a power shovel, industrial crane, or maintenance equipment, is found in Continental motors. If you have any power problems, put them up to "Power Headquarters," the Continental Motors Corp., Detroit, Mich., which will also be glad to send literature describing the sizes and uses of Continental motors.

A SURE WAY TO CUT TRUCK MAINTENANCE

There are many cities and contractors in this country that have reduced truck repair bills, kept trucks in constant use, prevented upward throw and side-sway, and have generally lengthened the life of the truck and body by the use of Gruss air springs. Complete information regarding Gruss air springs may be secured from the Cleveland Pneumatic Tool Co., Cleveland, Ohio.

AUCTION BRIDGE SCORES AVAILABLE

The American Playground Device Co., Anderson, Ind., has prepared for free distribution to municipal officials writing for them, auction bridge scores according to the 1926 rules. If you play bridge or your wife plays bridge, send for a copy.

WHERE AND HOW TO INSTALL WATER-METERS

In his illustrated 16-page catalog, R. W. Sparling, 945-951 N. Main St., Los Angeles, Calif., not only describes Sparling water-meters, but in an interesting and instructive way tells where and how water-meters should be installed.

CURE CONCRETE WHILE YOU MIX IT

Many road builders who previously used Dowflake as a surface curing agent are now using it added directly to the mix in the form of a solution, which results not only in greater economy and ease of handling, but insures more uniform curing because the curing agent penetrates throughout the mix. Full information describing how the mixing is accomplished may be secured from the Dow Chemical Co., 143 Water St., Midland, Mich.

DATA ON ROAD CONSTRUCTION

The Barber Asphalt Co., Philadelphia, Pa., will be pleased to send interested officials information regarding Trinidad native-lake asphalt and Bermudez road asphalt, two road-building materials that are attractive, resilient, easy to keep clean, free from noise, and easy to repair.

MOTOR-DRIVEN CENTRIFUGAL PUMPS FOR CITY WATER-WORKS

Type-S centrifugal pumps, which are of unusually high-grade construction and intended for rugged municipal service, are described in Leaflet No. 2064-A issued by the Allis-Chalmers Mfg. Co., Milwaukee, Wis.

SEWAGE DISPOSAL FOR ISOLATED BUILDINGS

In a pamphlet, "Low Cost Sewage Disposal," the Kaustine Co., Inc., Buffalo, N. Y., describes completely the Kaustine system of furnishing a strictly sanitary system of sewage disposal for isolated buildings in parks, playgrounds, etc.

REFUSE COMPLETELY DESTROYED BY FIRE

The Sterling destructor, in which city refuse is destroyed by the intense heat of its own fire, and which destroys garbage and rubbish at the same time, is described in a new 24-page illustrated book which may be secured free from the C. O. Bartlett & Snow Co., 6220 Harvard Ave., Cleveland, Ohio.

PUMPS FOR BIG AND LITTLE JOBS

The Aurora Pump & Mfg. Co., 507 Loucks St., Aurora, Ill., makers of Aurora deep-well or horizontal pumps, will be pleased to send information and prices on these pumps, which have high overload capacity, continued reliability, freedom from attention and repair, and sustained efficiency.

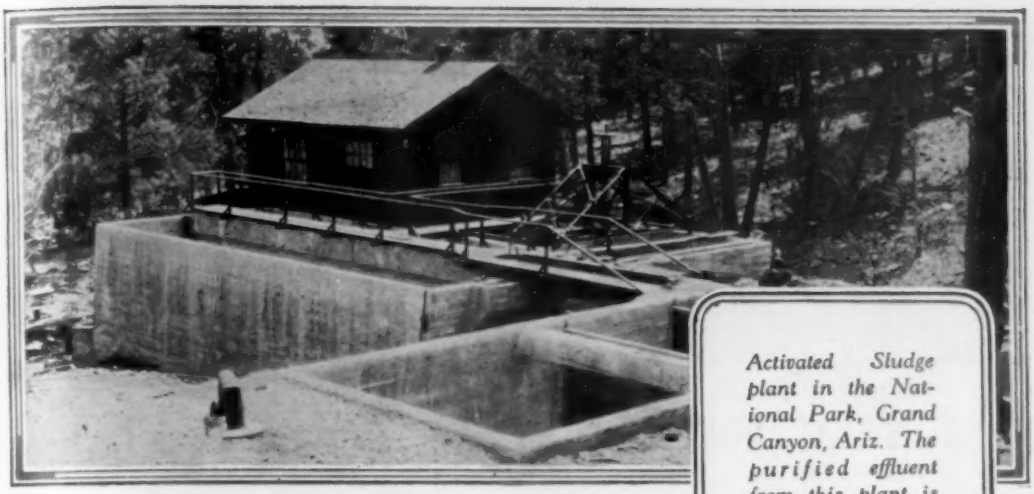
PROGRESS IN SANITATION

A new booklet, G-10, entitled "Progress," has been issued by the Sanitation Corp., 165 Broadway, New York. It tells the story of the continuous growth of this company and its progress in the several branches of sanitation, supplying, conditioning and improving water, and water waste, drainage and irrigation, treatment and disposal of sewage, trade wastes, refuse and garbage.

EQUIPMENT FOR REGULATING STREET AND HIGHWAY TRAFFIC

The Signal Automatic Co., Inc., 2829-31 Grand Ave., Louisville, Ky., has issued an illustrated folder in colors, giving the details of Sun traffic signals and automatic timers, for which it claims unsuaul efficiency.

See additional items on pages 4, 6 and 8



Activated Sludge plant in the National Park, Grand Canyon, Ariz. The purified effluent from this plant is used for irrigation, etc.

IN THE HEART OF THE GRAND CANYON—

Dorr Equipment

Why are Dorr Clarifiers found in all types of Sewage treatment plants ranging in size from the mammoth North Side plant at Chicago to the compact little plant pictured above?

The explanation is simple.

Dorr Clarifiers used as sedimentation units continuously remove the settled solids from the basins, produce a uniformly clarified effluent, and eliminate possibility of septic floating solids.

Its use cuts down the number of sedimentation units required, and allows for simple shallow tank construction.

These are some of the reason that have prompted the installation of over 150 Clarifiers throughout the country.

DORRCO

Write for bulletin on "Sanitary Engineering."

THE DORR COMPANY

ENGINEERS

247 PARK AVENUE NEW YORK CITY

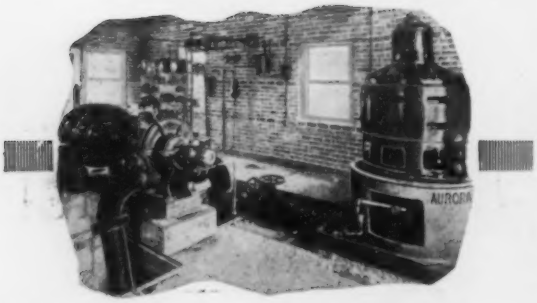
DENVER LOS ANGELES CHICAGO WILKES-BARRE JOPLIN

THE DORR CO. LTD
16 South Street London E.C.2

DORR G. m.b.H.,
Joachimsthalerstr. 10, Berlin W.15

SOC. DORR ET CIE.
126, Rue de Provence Paris 8

INVESTIGATION TESTS DESIGN EQUIPMENT



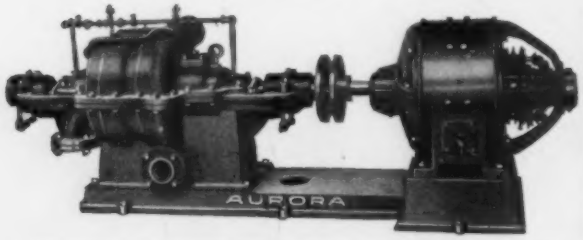
FOR BIG JOBS
and
LITTLE JOBS ALIKE

. . . where dependability, low cost per thousand gallons and freedom from attention and repair are demanded, Aurora deep well or horizontal pumps meet the most rigid requirements.
For the odd job—something out of the ordinary—here, too, Aurora pumps will make a magnificent record for themselves.
There is a type and size of Aurora Pump—deep well and horizontal—for every purpose. They are the most economical in the long run.

Do you want extremely high overload capacity?
Absolute reliability?
Freedom from attention and repair?
High sustained efficiency?
In every sense, a high-grade, dependable, efficient pump—at a reasonable price—the Aurora.

Send us your inquiries. Ask for the proof of performance and the outstanding features of Aurora Pumps.

Aurora Pump & Manufacturing Co.
507 Loucks St. Aurora, Illinois
Sales-Engineer Representatives in all Principal Cities



Aurora Pumps

Cheaper pumps may be bought . . . but better pumps can't be made.

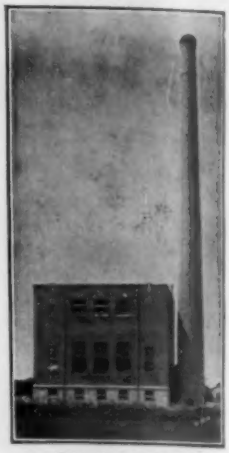
The Decarie Incinerator

A Perfected American Idea

The total cost of operation is less than any other plant.

It is its own power plant—not necessary to purchase electric power.

More have been installed in the United States than any other.



Stamford, Conn.
70-Ton Plant

The general reputation of the manufacturers eliminates all guess-work as to the reliability of Decarie Incinerators.

Illustrated catalog on request.

Decarie Incinerator Corp.
342 Madison Ave. New York

PHILADELPHIA
CHESTNUT and 39th STREET
Hotel Pennsylvania
Fireproof, Unrestricted Parking, Garage

OSCAR W. RICHARDS, Manager

600 Rooms - - 500 Baths

Rooms with running water from $2.50 per day
Rooms with private bath and shower from $3.50 per day
Food and Service the Best
Near West Philadelphia Station, Penn. Railroad
University of Pennsylvania Franklin Field

Water or Gas Main Caulking Set

The set of tools illustrated will meet all ordinary requirements for caulking mains 12 ins. or smaller. The set is furnished regularly in a stout leather carrying bag.

Tools that have the "feel" MUELLER Tools

There is a big difference in tools. Some have that certain *feel*—the right heft and balance—you know you can do a good job with them. Mueller tools have the *feel*. There's a reason — just this: Mueller tools are designed by men who use them, veterans who know what they should be, and they are tried out for months by men who are out on the job. That's why you know, when you pick it up, that a Mueller tool will do the job quickly and with the least effort.

MUELLER Pipe End Reamer

For reaming the ends of cut pipe. Takes the burr from pipe ends smoothly and quickly. Three steel blades easily kept sharp. Ratchet handle easy to use. For reaming pipe up to 1¼-in., specify G-10676; for sizes up to 3-in., G-10675.

Write for Mueller's special catalog on tools for gas companies.

MUELLER CO.

(Established 1857)

Factories: Decatur, Illinois; Port Huron, Michigan

Branches: New York, San Francisco, Los Angeles

Canadian Factory: MUELLER, Limited Sarnia

MUELLER

328

TO HELP YOU MEET HEAVY RESPONSIBILITIES

Why do the largest cities sterilize with Liquid Chlorine?

Liquid EBG Chlorine

This EBG Cylinder Valve Yoke permits of more rapid connection and disconnection of chlorine containers to other equipment by eliminating the necessity of making threaded connections each time a new cylinder is put in service.

Look for the RED Cylinder

WITH every resource and scientific fact at their command cities of the class of New York treat every gallon of drinking water with Liquid Chlorine. Through every conceivable test, as well as every day operation, they have proved that Liquid Chlorine kills the germs of typhoid.

You can profitably follow their example. Chlorination for smaller cities is as practical and economical as it is for the most congested communities. It will pay you to ascertain the facts.

We will be pleased to forward a copy of "Liquid Chlorine for Water Sterilization and Sewage Disinfection" on request. It contains information you should have.

Electro Bleaching Gas Co.

PIONEER MANUFACTURERS of LIQUID CHLORINE

Plant: NIAGARA FALLS, NY

Main office: 9 East 41st Street New York

Water Main Before and After Cleaning by the NATIONAL METHOD

Clean Mains Give Best Service

You cannot get as much water through a small pipe as you do through a larger one. Tuberculations reduce the diameter of a pipe. These tuberculations can be removed without injury to the pipe quickly and economically by THE NATIONAL METHOD. Cities and railroads all over the United States have had their mains cleaned in the last twenty-one years by the trained engineers of our organization, using THE NATIONAL METHOD. Hundreds of repeat orders are valued endorsements of the worth of the results obtained when mains are cleaned by THE NATIONAL METHOD.

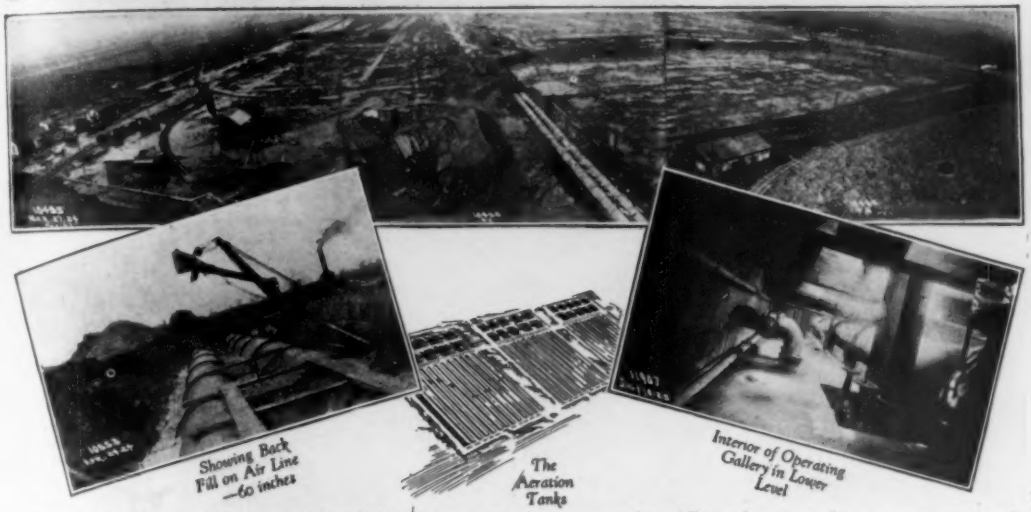
The National Water Main Cleaning Company

Burt B. Hodgman; Chief Engineer

Hudson Terminal Bldg. New York City

THE NATIONAL METHOD

1 Solution That Met 4 Different Problems And Gave More Service, Too



Showing Back Fill on Air Line —60 inches

The Aeration Tanks

Interior of Operating Gallery in Lower Level

IN the building of the new North Side Sewage Treatment works of the Sanitary District of Chicago, four distinct problems in the handling and treatment of sewage arose that involved the use of pipe. They were:

Problem No. 1. Great care and large amounts of money had been expended to provide equipment for cleaning the air, so that it would diffuse through the plates in the aeration tanks. The problem was to get the air to these plates in the same clean state. 60-inch air lines of Cast Iron Pipe were selected as being best fitted to transport the air free from rust, scale or other material, that might clog the diffusion plates.

Problem No. 2. Between the aeration and settling drains there is a pressure drain for carrying off sewage. The problem was to find the material best suited for this drain. 36-inch Cast Iron Pipe was selected for the pressure section. Where there is no longer any pressure, the main drain is of concrete.

Problem No. 3. The sludge which settles in the settling tanks is returned to the main building for retreatment with the incoming sewage. This is done under pressure and the material is abrasive. Again 36-inch Cast Iron Pipe was specified.

Problem No. 4. Water for use throughout the plant enters the service building and is redistributed from there. The pipe lines are all underground so 8-inch Cast Iron Pipe was selected.

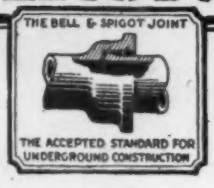
It is significant that combined with the special qualities that met these four particular problems, this user—and thousands of others—secured also the great guarantee of permanence found in the unquestioned and unrivaled durability of Cast Iron Pipe.

For information on pipe lines, ask this Bureau.

Address: RESEARCH ENGINEER
THE CAST IRON PIPE PUBLICITY BUREAU, PEOPLES GAS BUILDING, CHICAGO

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request



Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

The
annual operating
costs of
Sewer Department

By Using

G-K SEWER JOINT COMPOUND

Eliminating Infiltration and Root Growth

Write for Catalog No. 8

G-K SALES AGENCY

Macungie Pennsylvania

Heenan Refuse Destructors
for
GARBAGE DISPOSAL

No Odors By-Products
No Dust Offset
No Coal Operating Cost

Will install and guarantee results.

Hiler Engineering & Construction Co.
122 Livingston St., Brooklyn, N. Y.

HEENAN & FROUDE
Worcester, England

THE PACIFIC FLUSH-TANK CO.
CHICAGO and NEW YORK

Publishes
NINE CATALOGS
on

Sewer Flushing Siphons
Sewage Ejectors
Sewage Pumps
Sludge Pumps
Flush Tank Water Regulators
Sewage Disposal Apparatus
Imhoff Tanks

Full information regarding our products sent to anyone interested, write to our nearest office indicating line you desire to know about.

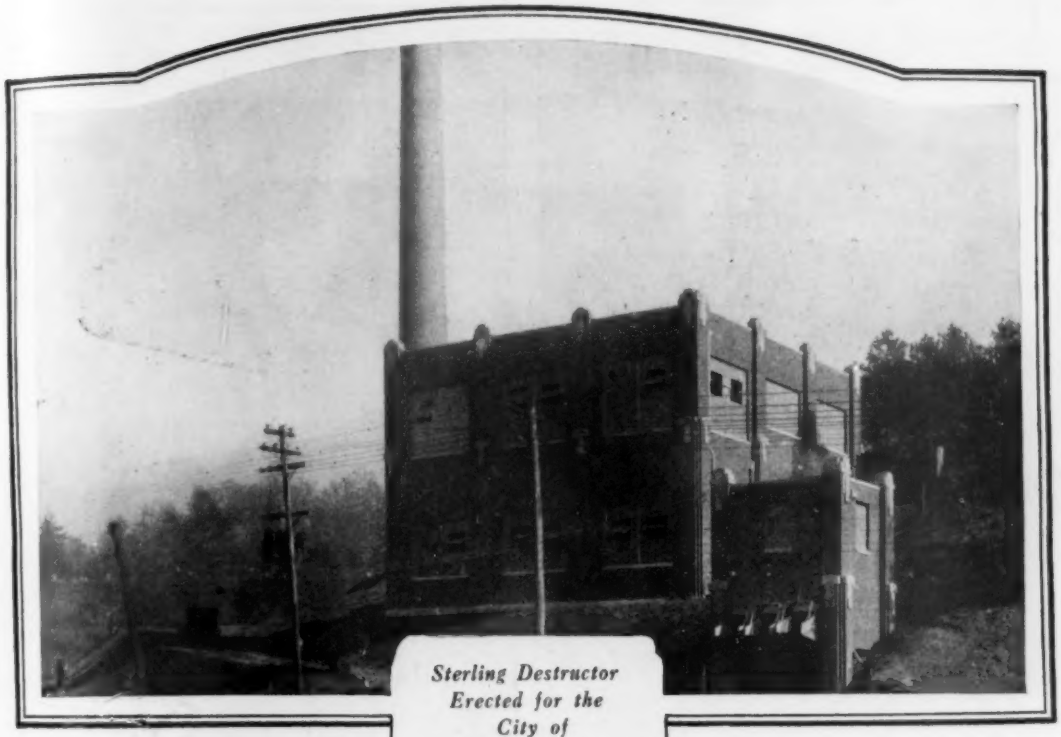
Pure Water

We manufacture filters for all domestic industrial and municipal requirements.

For over twenty-five years Roberts Filters have been supplying pure, clean water.

Write for descriptive literature.

Roberts Filter Mfg. Co.
DARBY, PA.



Sterling Destructor Erected for the City of Asheville, N. C.

Ideal Conditions for Asheville's Guests

Beauty and health are of unique importance in Asheville, N. C. Thousands of visitors seek this city every year because of its fame as a playground and health resort. They are exacting people accustomed to the best that life affords. Asheville must furnish ideal conditions for her guests.

The erection of a Sterling Destructor solved one of the city's most serious problems. Two previous disposal plants had failed within a comparatively short time. Careful investigation led the city to contract for a Sterling Destructor. This modern plant is in harmony with the charm of Asheville. It disposes of all city waste acceptably and at low cost to the taxpayer.

A new twenty-four page book that describes the principle of the Sterling Destructor and several important Sterling plants is ready for distribution. It is richly illustrated and non-technical.

THE C. O. BARTLETT & SNOW CO.
6220 Harvard Ave. Cleveland, Ohio

Bartlett - Snow

REFUSE DISPOSAL PLANTS

Public Health

is safeguarded when a

GODER

Municipal Waste Destructor

is used for

BURNING GARBAGE

Whether your town or city has 1,000 or 1,000,000 population, we can furnish an Incinerator, or design and build a complete Waste Disposal Plant for your specific needs. The GODER System is positively the most sanitary, the quickest and the most economical method of waste disposal.

Free descriptive literature and engineering counsel to city executives or architects. Write today.

GODER INCINERATOR CORP.

313 N. Michigan Blvd.

CHICAGO, U. S. A.

Flap or DrainValves

Plug Valves
Sluice Gates
Shear Valves

Coldwell-Wilcox Company
Water St. Newburgh, N. Y.

Portsmouth, Va.
120 tons — 24 hours.

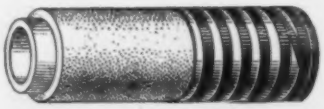
Satisfactory Garbage Disposal

INCINERATION in a "United States Standard" plant is proving a satisfactory method of garbage disposal in progressive communities today. Both garbage and rubbish are destroyed together, the rubbish generally furnishing sufficient combustible material to maintain the fire. The plant operates at the unusually high temperature of 2,000 degrees F.; this insures complete combustion of all refuse without any objectionable smoke or odor.

Write for our Booklet No. 1 if you are interested in knowing more about this satisfactory method of garbage disposal; state the population of your town and the present method of refuse disposal.

Pittsburgh-Des Moines Steel Company
903 Curry Building Pittsburgh, Pa.

WRITE US FOR CATALOG



"MICHIGAN" WATER PIPE

ECONOMICAL — DURABLE

IDEAL FOR: Water Works Supply
Power and Manufacturing Plants
Railroad Water Supply

MICHIGAN PIPE CO., Bay City, Mich.

DARLING

FIRE HYDRANTS
AND
GATE VALVES

"the fire chief's choice"

DARLING VALVE & MFG. CO.
WILLIAMSPORT, PA.

WATER METERS

DISC METER
Nash Type K

METERS to meet the service conditions. We make six distinct types and feel confident of giving you satisfaction.

The CROWN is an unusually substantial meter of a rotary piston design. The NASH is a first rate disc model, the "daddy" of all disc meters, designed by L. H. Nash. The GEM, a velocity type, is the best ever for big, heavy flows. And you know what the EMPIRE oscillating piston meter can do for you in the way of accuracy and economical operation. The EMPIRE and GEM combined form our EMPIRE-COMPOUND,—fine for variable services. We even make a Venturi style, the PREMIER.

We have been in the meter business for over fifty years. Why not talk things over with us the next time meters are wanted? No obligation—our experience is at your disposal.

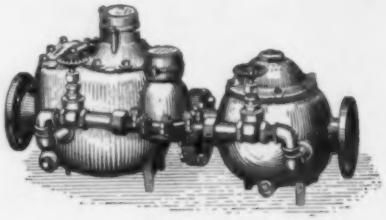
NATIONAL METER COMPANY
299 Broadway, New York

Chicago Boston Cincinnati
Atlanta San Francisco Los Angeles

Successful Since Sixty-Eight

For Large and Small Flows

NILO
Compound Meter



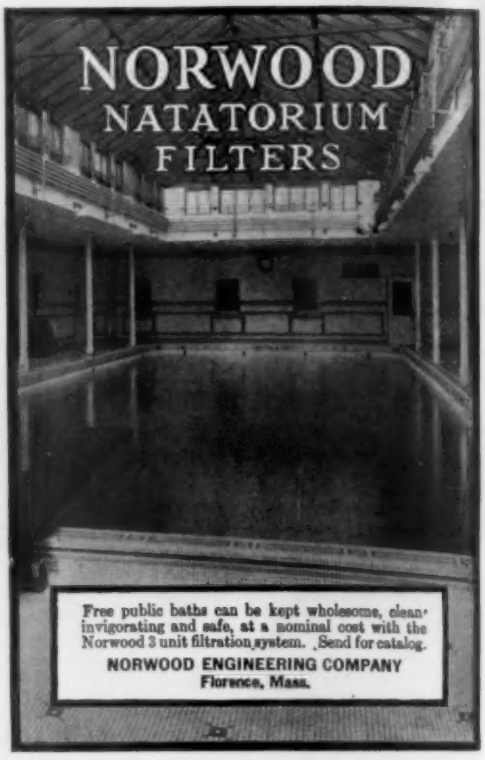
Where the flow is too small for the larger type, or too large or in excess of delivery of smaller meter, Nilo Velocity Meter and King Disc Meter with Union Compounding Valve will prove a most substantial investment. This combination means absolutely faithful measuring of all the water passing through it.

Union Water Meter Company, with nearly sixty years' manufacturing history, claims for this combination the highest efficiency in design and perfection in workmanship.

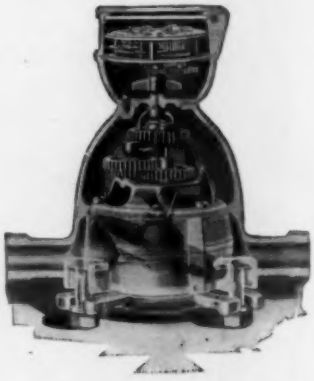
Catalog A-57 describing the complete line of Union meters will be gladly sent to you upon request.

Union Water Meter Co.
WORCESTER, MASS.

New York Office: 50 Church Street
Phila. Office: 539 Real Estate Trust Bldg.


NORWOOD
NATATORIUM
FILTERS
Free public baths can be kept wholesome, clean, invigorating and safe, at a nominal cost with the Norwood 3 unit filtration system. Send for catalog.
NORWOOD ENGINEERING COMPANY
Florence, Mass.

"WATCH DOG"
WATER METERS



Inquiries Solicited

GAMON METER COMPANY
Main Office and Works
NEWARK, NEW JERSEY

CHICAGO
360 N. Michigan Ave.

SEATTLE
2013 L. C. Smith Bldg.

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Will the New Year write ~~ PROFIT *on the ledgers?*

YOUR income, your profits, are dependent directly upon the efficiency with which your water meters are maintained. The meter is the measure of your income. It should be safely housed, and be available at all times for inspection. It should be easily removed for testing or replaced in a few moments. Your meter reader's time is money and should not be wasted in back calls.

Resolve~~~ to put your Meters in *Ford* Settings in 1927!

Two principal types—single lid covers and double lid covers.

Ford Water Meter Settings place your meters at the curb where all the water entering the property is measured, where they are safe from freezing, hot water damage or fire. The Ford Worm Lock prevents tampering and raises the lid when unlocked. Meter readers can read more "Ford set" meters per day and they are never tempted to enter fictitious readings to save call-backs.

Send for Catalog today!

The FORD METER BOX CO.

mail this

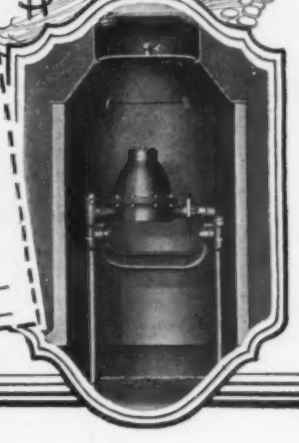
Wabash-Indiana

The Ford Meter Box Co.,
Wabash, Indiana

Send me your illustrated catalog and more information on Ford Water Meter Settings. I am interested in ____ single lid covers. ____ double lid covers. ____ Ford Yokes, ____ Ford Grips, ____ Meter Testing Machines, ____ Ford Ram's Horn, ____ Type S Boxes.

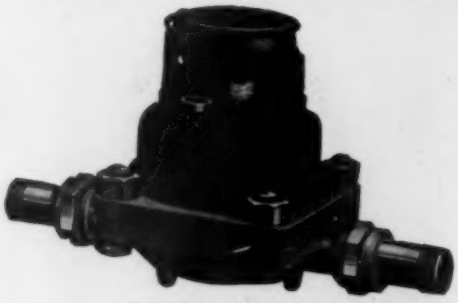
Name _____

Address _____



American and Niagara
WATER METERS

FROST BOTTOM TYPE



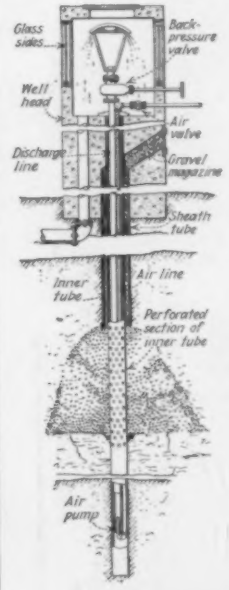
SOLID CASING TYPE

They are the most complete line of disc water meters made in one factory. There is a size and type suitable for every requirement where a disc meter is used. Write for complete new catalog.

BUFFALO METER CO.

Established 1892

2902 MAIN ST. **BUFFALO, N. Y.**



Free Your Wells From Sand

Pump your wells with

SULLIVAN AIR LIFT

This system gets rid of sand and places coarse gravel around the strainer—your wells are permanently freed from sand trouble. Ten other advantages of this system will interest you, too. See Bulletin 371-I.

New 48-page handbook, free to Water-Works men. Write today for Bulletin 371-I.

SULLIVAN MACHINERY COMPANY
125 S. Mich. Ave., Chicago

THE CLARK METER BOX — TRADE MARK — PROTECTION

PERFECT LOCK

Consists of one piece phosphor bronze bolt engaging on an incline plane on cover to lock, and likewise engages on a similar plane on lid to unlock. No rivets, bolts or screws to rust and prevent operation. Always Dependable.

THE ONLY ALL BRONZE METER BOX LOCK

H. W. CLARK COMPANY

Manufacturers Water Works Equipment
Mattoon, Illinois, U. S. A.

Meter Boxes—Coupling Yokes—Meter Testers—Service Boxes
Valve Housings—Trouble Finding Instruments

Pure Water for Pools —at less cost

A pool that is always sanitary, the water always clear and sparkling costs less to operate than one not so protected.

Complete information in Bulletin 500 Write for it

GRAVER Corporation Founded 1877
EAST CHICAGO, INDIANA

Write for our New Book

 The offices of THE AMERICAN CITY, 443 Fourth Ave., N. Y., are headquarters for information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.

"THE BETTER METER"

The

FEDERAL

Do not fail to give this matter your consideration before placing your order. Note these special features:

1—Large-capacity registers.

2—Non-leaking stuffing box of the internal type.

3—Extra heavy gear train, oil-enclosed type.

4—Gear train lubricated without removal from the meter.

5—Measuring chamber of ample dimensions.

6—Breakable cast-iron bottom, rendering the meter frost-proof.

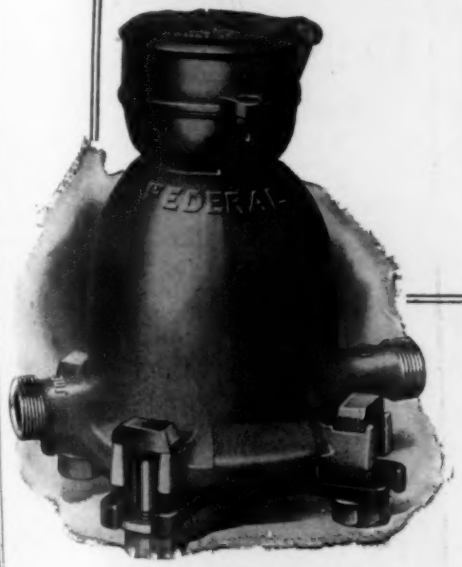
7—Accuracy on all flows, from the largest to the smallest stream.

8—Best materials obtainable used in construction.

9—Two-year guarantee against defects in material or workmanship.

10—Keynotes:

SIMPLICITY
ACCURACY
DURABILITY



Made in ⅝-in., ¾-in., 1-in., 1½-in. and 2-in. sizes.

FEDERAL METER CORP.

EAST ORANGE, N. J.

FROST PROOF METERS

LAMBERT FROST-PROOF METERS are the most efficient, simplest and easiest water meters to take apart and put together again. Long life and accuracy are inherent qualities with these meters. When frozen the patented non-corrosive yielding bolt device permits the top and bottom casings, disc chamber and gear train to part, thereby preventing any damage to the casing or internal mechanism. This frost-proof device can be used over and over again after the meter has been frozen without the need of any new parts.

Complete descriptive literature sent at your request.

THOMSON METER CORPORATION

SALES OFFICES

50 East 42nd St. New York City

METERS

PITTSBURGH METER CO.

The Tropic — An all-bronze Water Meter, with connection spuds attached to the lower case. Particularly designed for warm sections of the country.

The Arctic — A frost-bottom Water Meter, especially designed for cold sections of the country.

These two meters embody exactly the same mechanical features, the only difference being the changes necessary to provide a frost-breaking feature in the Arctic.

Either of these meters will be equipped with a COMPLETELY ENCLOSED intermediate train RUNNING IN OIL, if desired.

Write or wire nearest office for full information.

PITTSBURGH METER CO.

General Office and Works: 7800 Susquehanna St., Pittsburgh, Pa.

SALES OFFICES

New York Chicago Kansas City Columbia, S.C. Seattle Los Angeles

NOVO POWER

ENGINES - HOISTS - PUMPS

NOVO ENGINE CO.

Clarence E. Bement, Vice-Pres. & Gen. Mgr.

LANSING — MICHIGAN

Van Gilder Water Meter

"The Meter with a Conscience"

Runs in Oil.

Lubrication Plus

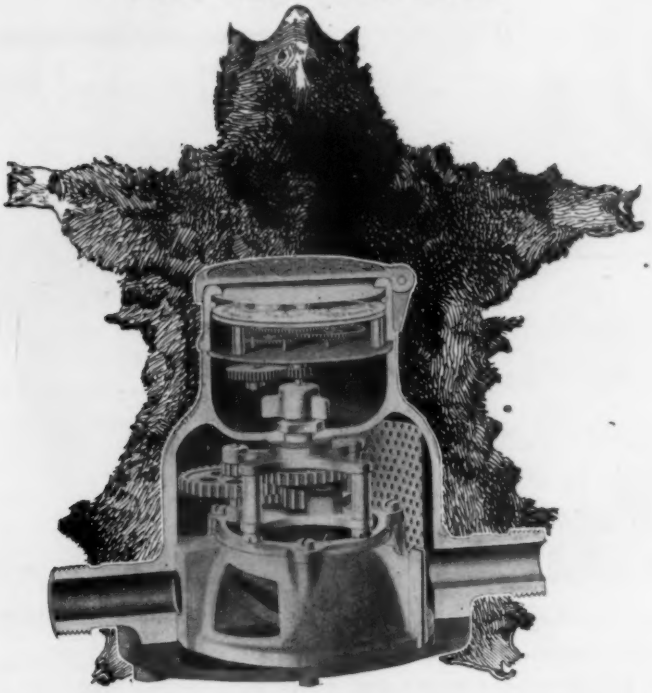
This meter not only has the gear train running in oil, but even the register itself is submerged in a pure white oil protected by unbreakable glass on a dirt and moisture sealed register box.

Wear proof—Corrosion proof—Always readable.

VAN GILDER WATER METER CO.

PLEASANTVILLE NEW JERSEY

"Gateway to Atlantic City"



Does a Thick Tin Skin *Protect* a Water Meter?

THE experience of thousands of users of Hersey Domestic Water Meters proves that the answer is Yes — emphatically, YES!

Tinning protects the meter against corrosion. It adds years of life to meter service. It prevents premature decay. When accumulations occur they are much more easily removed from a tinned surface than from an untinned surface. Repairs are much less frequent and the work is much more easily accomplished.

Dipping adds a much thicker coat of metal than any other process. Therefore Hersey Meters are dip tinned. It is slow and expensive, but it gives the best results. Dip tinning is an exclusive Hersey process.

The **BALANCED DISC PISTON** which enables Hersey Meters to run for years without loss of registration is another exclusive **HERSEY** feature found in no other meter.

If performance determines your purchase of water meters, then you will want these accurate, dependable revenue computors to work for you.

Hersey Manufacturing Company, South Boston, Mass.

HERSEY
WATER METERS

NEW YORK, N. Y., 290 Broadway
PORTLAND, OREGON, 475 Hoyt St.
PHILADELPHIA, PA., 314 Commercial Trust Bldg.
ATLANTA, GA., 610 Citizens & Southern Bank Bldg.
DALLAS, TEX., 2301 Griffin Street
CHICAGO, ILL., 10 So. LaSalle St.
SAN FRANCISCO, Cal., 690 Market St.
LOS ANGELES, Cal., 450 East Third St.

Main Office and Works: Corner E and 2nd Sts., South Boston, Mass.

For Dependable Service Installations

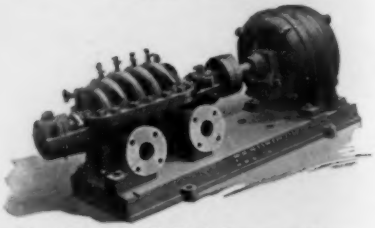
***"Wakefield"* Galvanized Amalgamated Lead Lined Iron Pipe and Fittings**

Low Cost—Easily Installed—Permanent

Inquiries respectfully solicited

LEAD LINED IRON PIPE COMPANY
WAKEFIELD, MASS.

Economical In First And Final Cost



New Type EMF High Pressure Pump

This Single Suction Multi-Stage Centrifugal Pump is the best ever designed for high heads—up to 800 feet, or boiler pressures up to 350 lbs. Capacity, 300 G.P.M. up.

These outstanding construction features guarantee high operating efficiency at minimum maintenance cost: Horizontal Split Case, Hydraulically Balanced, Fully Bronze Fitted, Cast Bronze One-Piece Impellers, Alloy Steel Ground Shaft, Water Sealed Stuffing Boxes, etc. For any type of drive.

Write for New Bulletin No. 406.

ECONOMY PUMPING MACHINERY CO.
Centrifugal Pump Specialists
62-120 North Curtis St. Chicago, Illinois
Sales Offices in Principal Cities

"POMONA" Double Stroke Deep Well Power Pump
Write for descriptive catalogs
UNITED IRON WORKS, Inc., Kansas City, Mo.

INDEPENDENT *for Permanent* **SEWERS**
Reinforced Concrete Pipe
Independent Concrete Pipe Company, Indianapolis, Ind.

For the maintenance of constant water levels in elevated tanks
The
JOHNSON TANK LEVEL CONTROL
Made by the manufacturers of
The
JOHNSON WELL SCREEN
Send for illustrated catalogs
Edward E. Johnson, Inc.
2304 Long Ave., St. Paul, Minn.

DONALDSON IRON CO.
EMAUS, LEHIGH CO., PA.
MANUFACTURERS OF
CAST IRON PIPE
FOR WATER AND GAS
ALSO SPECIAL CASTINGS AND FLANGE WORK

Scrapped!

Yes—But Never the Badger

AFTER a few days of sub-zero weather look through the scrap box in your meter shop. Check up on your frost damaged housings. How many are distorted, warped? How many with the retaining lugs torn away through ice pressure? Good money thrown away. Useless, nothing but junk.

But not a Badger Model "A" in the lot!

And why? Badgers are built to stand the worst that Old Man Winter can do. They are built to last! Look at the sturdy construction indicated on the Model "A" at the right. Under freezing pressure only one thing can give — and that's the bottom plate. If you have no Badger "A"s in stock ask us for one and try the freezing test yourself.

Badger "A"s save time, save worry, save money!

And freezing is but one thing covered in this statement by the Master Meter Mechanic of a large Western city—"Our records show that Badger Meters are less liable to get out of order and when it is necessary to repair them, the cost of doing so, both in labor and material, is much lower than other standard makes we have in use."

If Badger "A"s are working on your lines you know all this. If they are not, ask us for a sample for your own tests. See for yourself the heavy housing, the fine machine work throughout—all that goes to make a high grade product.

Ask us for literature

Note the heavy reinforcing lugs. They cannot tear off. They insure the housing against distortion. They make the Badger "A" a meter "built to last"

Badger Meter Manufacturing Company
MILWAUKEE, WISCONSIN

BRANCH OFFICES:
CHICAGO, 111 W. Washington St.
KANSAS CITY, MO. Interstate Bldg.

BADGER METERS

BROOKLYN, N. Y., 367 Fulton St
SEATTLE, WASH. 4040 Arcade Bldg.
DENVER, COLO., 1621-39 15th St.

Michigan Valves

are incorporated in the larger Filtration Plant installations in the United States:

Chicago	Buffalo
Washington, D. C.	Cleveland
Hine, Mo. (for St. Louis)	St. Paul
Champaign, Ill.	Toledo
Springfield, Ill.	Kansas City
Topeka	Detroit
New Orleans	Minneapolis

Send for descriptive matter

MICHIGAN VALVE & FOUNDRY CO.

Established 1852

DETROIT, MICHIGAN

Manufacturers of Appurtenances for Water Works Systems, Filtration, and Sewerage Plants. Fire Hydrants, Gate Valves, Tapping Valves, Tapping Sleeves, Valve Boxes, Post Indicators, Sluice Gates, Floor Stands, Check Valves, Shear Gates, Flap Valves, Foot Valves, Plug Valves, C. I. Fittings, C. I. Specials, Bronze Castings, etc.

Leaks—Find Them With

GEOPHONE

For detection of sound

Scientific—Sensitive—Practical

For Information Address

Distributors

Empire Electric and Water Co., Inc.

452 Lexington Ave., New York, N. Y.

***The* M. & M. METER BOX**

A complete meter setting with locking top

18 inches deep, 15 inches diameter. Accessible for reading, installation or removal for repairs.

Full information on request.

CLARKSVILLE FDRY. & MACH. WKS.

CLARKSVILLE TENN.

WEHR *The 'Original' One Man Fordson Powered* **GRADER and SCARIFIER**

for efficient, low-cost road building and maintenance and snow removal

WEHR COMPANY **532-30th Street, Milwaukee, Wis.**

THREE PART ADJUSTABLE

MANHOLE TOP

Permits re-adjustments and replacements without disturbing pavement, and saves 50 per cent. material, and 90 per cent. labor.

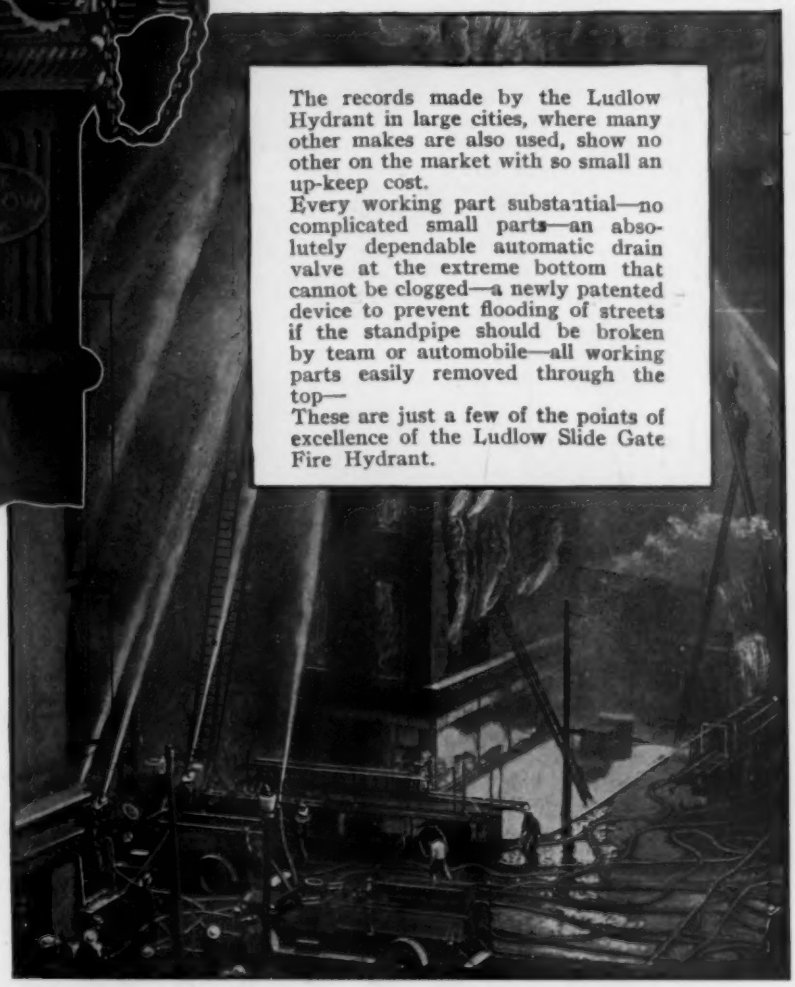
WATER TIGHT HOUSING

S. E. T. VALVE & HYDRANT CO.

50 Church St., New York City 208 Times Bldg., Troy, N. Y

MUNICIPAL STREET CASTINGS

LUDLOW
The always dependable
HYDRANT



The records made by the Ludlow Hydrant in large cities, where many other makes are also used, show no other on the market with so small an up-keep cost.

Every working part substantial—no complicated small parts—an absolutely dependable automatic drain valve at the extreme bottom that cannot be clogged—a newly patented device to prevent flooding of streets if the standpipe should be broken by team or automobile—all working parts easily removed through the top—

These are just a few of the points of excellence of the Ludlow Slide Gate Fire Hydrant.

THE LUDLOW VALVE MFG. CO.
TROY, NEW YORK

BRANCHES:
New York, 62 Gold Street
Boston, 1112 Tremont Bldg.
Philadelphia, Harrison Bldg.
Pittsburgh, 815 Oliver Bldg.
Chicago, 731-733 The Rookery
Kansas City, R. A. Long Bldg.

SOUTHERN REPRESENTATIVE:
W. F. Wilcox,
Fourth Nat'l Bank Bldg.,
Atlanta, Ga.

UNSANITARY SEWAGE DISPOSAL IN AN ANCIENT EUROPEAN CITY

"PROGRESS"

as outlined and illustrated in Bulletin G-16 will interest you. Send for a copy

Apparatus, Equipment and Complete Plants for Water, Sewage, Trade Wastes, Garbage and Refuse

THE SANITATION CORPORATION

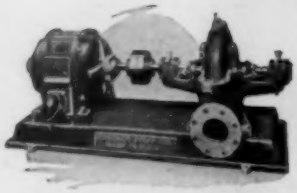
165 Broadway
New York City

"Every Branch of Sanitation"

PUMP ABC

By an Engineer

Always Buy Chicago



"Chicago" Type "D" Centrifugal Pump. It is used for House, Booster, Circulating, and Fire duties. Sizes up to 6-in. Capacities up to 2,000 G. P. M.

Multi-Stage pumps for large capacities and high pressures can also be furnished.

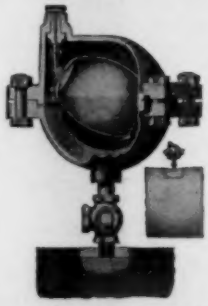
CHICAGO PUMP COMPANY

SEWAGE-CONDENSATION-CIRCULATING
BILGE-FIRE-HOUSE-VACUUM

2319 WOLFRAM ST. CHICAGO

AIR IN PIPE LINES

Experienced hydraulic engineers realize the difficulty due to air in supply mains. Its accumulation at the summits reduces the capacity of the line and under some conditions entirely stops the flow.



SIMPLEX AUTOMATIC AIR RELEASE VALVES have been designed to automatically release the accumulation. They possess the merits of reliability, simplicity, compactness, accessibility and low cost, all of which is proved by over fifteen years' satisfaction to the many users.

Interesting Data on Request

SIMPLEX VALVE & METER CO.

6743 Upland St. Philadelphia, Pa.

Manufacturers of Meters and Rate Controllers of the Venturi type. Gauges, air and vacuum valves and other water works devices.

KENNEDY

for water-works service

IN hundreds of installations all over the country, Kennedy equipment for water-works service is proving the exceptional efficiency of Kennedy design and the thorough reliability of Kennedy construction.

New York, Chicago, Boston, St. Louis, Cincinnati and Detroit are only a few of the cities in which Kennedy Valves and Fire Hydrants are providing dependable control of water supply and fire protection systems.

The KENNEDY VALVE MFG. CO.
ELMIRA, N. Y.
Branches in principal cities

VALVES—PIPE FITTINGS—FIRE HYDRANTS

The

Perfect Valve Inserting Machine

was designed to enable Water-Works Superintendents to install proper valves *without risk or inconvenience to consumers.* It is made in four sizes: No. 1 for inserting 4-, 6- and 8-inch valves; No. 2 for inserting 8, 10- and 12-inch valves; No. 3 for inserting 14-, 16-, 18- and 20-inch valves; and No. 4, special for inserting 24-inch horizontal valves. The operation of this machine is "as simple as rolling off a log."

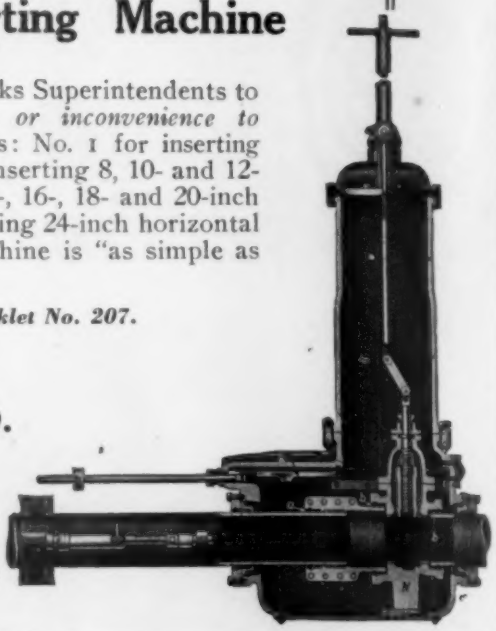
Write us for illustrated booklet No. 207.

The

A. P. SMITH MFG. CO.

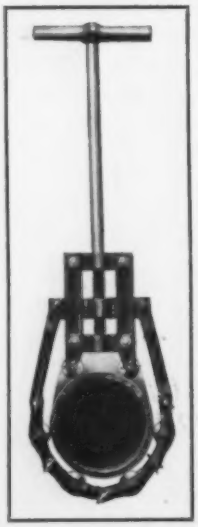
East Orange

N. J.



Makers of Smith Tapping Machines, Valves, Lead Furnaces, Pipe Cutting Machines, Gate Valves and Other Water-Works Specialties.

ELLIS PIPE CUTTER



See the picture:—Every point in contact with the pipe is a cutting disc. Therefore the cutter, when adjusted to the pipe, need be moved only a small part of a circle in order to cut entirely around the pipe.

No. 01 cuts all kinds of pipe 4-in. to 8-in.

No. 1 cuts all kinds of pipe 4-in. to 12-in.

Let us send you one of these pipe cutters on trial.

ELLIS & FORD MFG. CO.

38 Piquette Avenue,

DETROIT, MICH.

The EDDY Hydrant

Eddy Fire Hydrants have many points that appeal to water-works men. For example:

A damaged valve can be replaced in a few minutes at slight expense.

Should the standpipe be broken, not a drop of water need be lost.

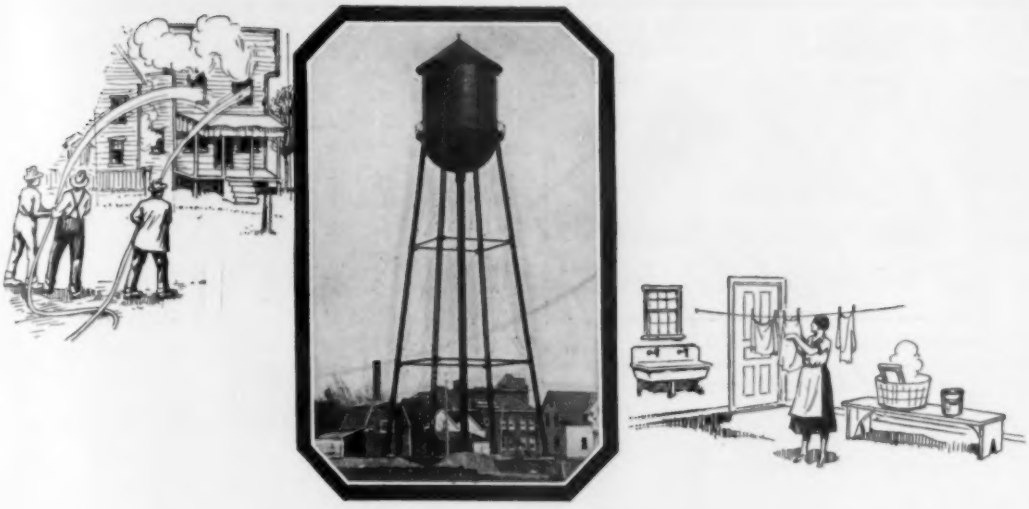
All hydrants are frost-proof.

These and many other points of excellence are thoroughly explained in our catalog, which it will pay you to study.

Also manufacturers of the well-known Eddy Valve.

EDDY VALVE COMPANY

WATERFORD NEW YORK



Water—and plenty of it

SALES OFFICES
Pittsburgh
Des Moines
New York
Atlanta
Chicago
Dallas
Seattle
San Francisco

THIS Pittsburgh-Des Moines elevated tank at Clark, South Dakota, stores 100,000 gallons of water. This insures a plentiful supply for daily needs and also an adequate reserve for fire protection.

The tank is filled each day with a few hours' pumping; gravity pressure then distributes this water in steady streams whenever it is needed. Both supply and pressure are adequate for any demand.

Pittsburgh-Des Moines tanks are providing storage for many communities and outlying metropolitan districts. Some of these tanks have been in service for over thirty years. Steel will not rot, leak, burn, or burst; a steel tank means dependable, efficient and economical water storage.

Are you interested in improving or enlarging your water system? Or building a new plant? Write for details of a Pittsburgh-Des Moines steel tank to provide storage.

Send for our Water Works Catalog—Booklet No. 1

Pittsburgh-Des Moines Steel Company

903 Curry Bldg., Pittsburgh, Pa. **905 Tuttle St., Des Moines, Iowa**

PITTSBURGH DES MOINES

NEWARK REINFORCED CONCRETE PIPE

Newark
REINFORCED CONCRETE PIPE
"It makes a better joint"

Contractors who have had experience with practically all types of precast reinforced concrete pipe have expressed their hearty approval of the NEWARK type of joint, as they have found it is the cheapest form of joint to lay properly.

NEWARK CONCRETE PIPE CO.
462 BROAD ST. NEWARK, N. J.

NEWARK, N. J. BUFFALO, N. Y. DOVER, N. J. ROCHESTER, N. Y. CLEVELAND, O.

Pat. No. 965163

D. & D. Safety and Noiseless Cover

WM. E. DEE COMPANY

80 N. La Salle Street Chicago, Ill.

We manufacture Manhole, Cach Basin and Sewerage Castings of all kinds. We make anyhing in Gray Iron. Write for our prices.

IN DESIGNING ACTIVATED SLUDGE PLANTS

ENGINEERS SPECIFY **FILTROS** DIFFUSER PLATES

GENERAL FILTRATION CO., INC., CUTLER BLDG., ROCHESTER, N. Y.

DIXON'S WATERPROOF GRAPHITE GREASE

The graphite is the vital element, for it imparts to bearing surfaces a remarkable smoothness that relieves the grease of a very considerable portion of its task of keeping metallic bearing surfaces apart and takes upon itself the wear which would be borne by the metal. The flake graphite increases both the efficiency and endurance of the lubricant.

Dixon's Waterproof Graphite Grease is of dense consistency, suitable for general heavy service with slow speeds and heavy pressures.

It possesses a remarkable adhesiveness and cannot be washed off, even by running water, sea water, or alkaline and sulphuric mine water. It cannot gum or become rancid. As a rust preventive it is unsurpassed.

Write for Circular 148-W.

JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J. Established 1827

WATER PURIFYING EQUIPMENT
for
SWIMMING POOLS, INDUSTRIES, ETC.

Send us your problems for solution.

Everson Filter Co.
647 No. Green Street,
CHICAGO

JAMES B. CLOW & SONS

General Offices:
201-299 N. Talman Ave., Chicago

Works:
Coshocton, O. Chicago, Ill. Newcomerstown, O.

Sales offices in all principal cities

Manufacturers of Cast Iron Pipe and Fittings

Returning a Profit To the Municipality

Every power plant that is to continue in service must show profitable operation. There is no reason why a properly equipped and managed municipal plant cannot return a profit to the community. This, however, cannot be expected from inefficient, obsolete power units. A change to Diesel engines has in many instances changed a plant from a burden to an asset. No other type of power unit in which power is derived from fuel can show as low a unit power cost as the Diesel engine.

If your power plant is not profitable, or if you are considering the installation of more units, investigate the advantages of Nordberg Diesel Engines. Bulletin NY-3 describes them.

Nordberg Manufacturing Co.
Milwaukee ◆◆◆ Wisconsin

Nordberg Diesel Engines Reduce Municipal Plant Power Costs

NORDBERG

Massachusetts experiments

Massachusetts State Highway between Lowell and Lawrence, constructed with TEXACO Asphalt in 1912. No repairs to date.

TEX

New York
Philadelphia
Richmond
Boston
Chicago

THE TEXAS CO.,
17 Battery Place,

—and makes a discovery

In 1912, some ten or eleven different asphalts and tars were used in an experiment by the Massachusetts State Highway Department. A Penetration Macadam highway was constructed, consisting of a series of sections, each built with a different asphalt or tar.

We are now in 1926, and fourteen years of State highway traffic has utilized this experimental road.

Not only has the TEXACO ASPHALT section of the trial highway survived the traffic and climatic conditions of the past fourteen years, but it has done so without requiring the expenditure of a dollar for repairs.

Under equal and often more trying conditions than these of this Massachusetts State highway, streets and highways of TEXACO ASPHALT have successfully served communities throughout the country.

TEXACO

Asphalt Sales Dept.
New York City

Cleveland
Kansas City
Jacksonville
Dallas
Houston

TRADE "LEADITE" MARK

Registered U. S. Patent Office

A list of the Country's principal cities, large and small—

Is a list of the satisfied users of LEADITE.

Leadite Users are Leadite Boosters

EAST or West, North or South, take your pick of the cities—and you'll find many of them on the customer list of Leadite—

The country's principal cities, large and small—the country's representative water works engineers, construction companies and water works departments of industrial plants, railroads and mines are strong for Leadite for jointing cast iron water mains—

Are demonstrating what you will be able to do when you use Leadite—

What, for instance?—

You will do away with the need for caulking—or the need for digging out for large bell holes.

You will be able to use Leadite for all sizes of pipe from 4 in. to 60 in. diameter—under all pressures and conditions.

Give Leadite a trial.
Leadite resists electrolysis.
Leadite does not corrode or rust.
Leadite has been successfully tested and used for over 30 years.
Thousands of miles of pipe jointed with Leadite are in service.
The up-to-date water works man specifies and uses LEADITE.

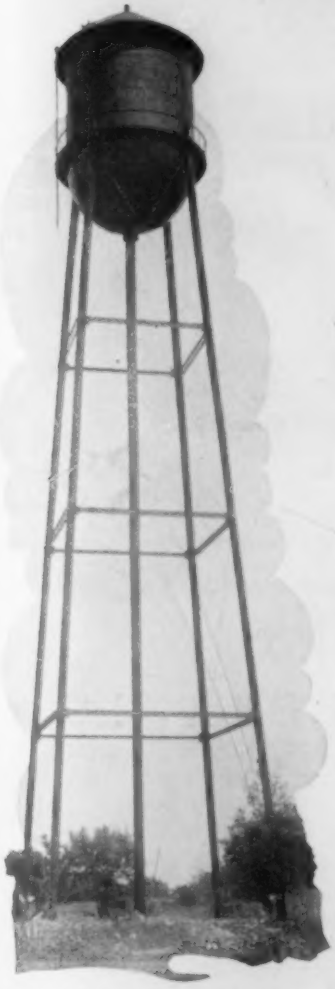
LEADITE saves at least 75 per cent.

LEADITE is the pioneer self-calking Material for c. i. pipe
Be Sure It Is LEADITE and Accept No Imitations

THE LEADITE COMPANY, Inc.
100 So. Broad St., Philadelphia, U. S. A.

NO CAULKING

Municipal distribution at constant high pressure



At Republic, Missouri, this 75,000-gallon hemispherical-bottom Horton Tank supplies the city. The height-to-bottom is 117 feet 6 inches to maintain an unvarying high pressure on the mains.

A Horton Tank on the city mains will improve distribution by maintaining a uniform high pressure that does not vary with demand. The tank will hold a reserve to meet sudden need in case of fire. Flow will always be certain—always dependable.

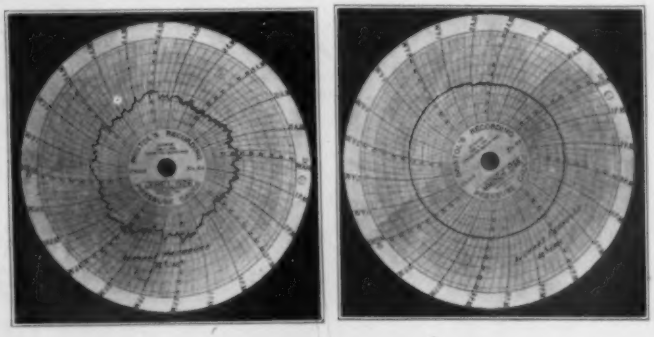
A municipality served by a Horton Tank benefits by reduced insurance rates. Pump capacity required to fill the tank is often less than that necessary to maintain pressure in a direct pumping system. Pump operation costs are comparatively low since, with the tank, the pumps operate under practically constant pressure conditions.

Look at the small charts below. The one on the left shows a variation in pressures of from 20 to 42 pounds in the water mains at Charleston, S. C., before a 2,000,000 gallon Horton Tank supplied the city. The chart on the right shows the variation reduced to from 40 to 46 pounds after the installation of the tank. Any Horton Tank, of whatever capacity a community needs, will have the same effect of equalizing distribution pressure.

Install a Horton Tank for better distribution, more dependable fire protection, lower insurance rates and lower pumping costs. Full information on ellipsoidal—or hemispherical-bottom types.

Chicago Bridge & Iron Works

Chicago	2127 Old Colony Bldg.
New York	3108 Hudson Terminal Bldg.
Cleveland	2236 Union Trust Bldg.
Dallas	1606 Praetorian Bldg.
Atlanta	1014 Healey Bldg.
San Francisco	1033 Rialto Bldg.
Havana, Cuba	Apartado 2507



HORTON TANKS

A-C-12 Gray

Waterous
Dependable

ASK YOURSELF THIS HYDRANT QUESTION

"Why do practically all of the major cities in the United States call for compression type hydrants in their specifications?" Then follow through by checking up the outstanding features of the Waterous compression type hydrant. You'll find time spent in looking over the Waterous catalog is well worth while. You'll receive one for the asking.

WATEROUS FIRE ENGINE WORKS
INCORPORATED

Also Manufacturers of the "Waterous" Rotary Pump

Saint Paul -x- **Minnesota**

EASY TO OPERATE

The Columbian Fire Hydrant

Those who have had to contend with some of the more complicated fire hydrants appreciate the extreme simplicity of the Columbian Fire Hydrant. There is complete absence of any uncertain features in operating the main valve. All working parts are removable through the top of the hydrant without disconnecting the hydrant in any manner.

Our modern and improved line also includes Columbian valves and valve boxes, sluice gates, meter boxes and other water-works supplies.

Let us send you our booklet.

COLUMBIAN IRON WORKS

CHATTANOOGA **TENNESSEE**

MATHEWS

REG. U. S. PAT. OFF.

FIRE HYDRANTS

Regular Hydrant

Note the simplicity of design. This, as you know, means few parts, assuring the minimum of repairs and upkeep expense.

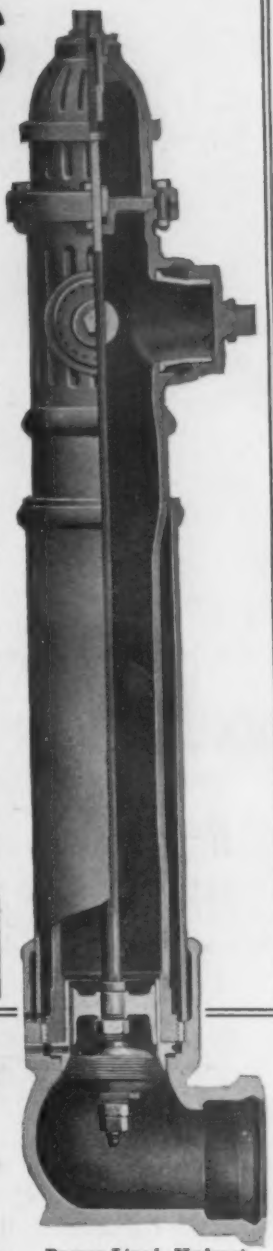
The addition of the bronze lining makes these hydrants practically indestructible.

If you want a dependable, long-wearing, frost-proof, automatically drained hydrant—

Use the Mathews

Mathews Fire Hydrants are made in both standard and high pressure types. (See our illustrated catalog.)

We also manufacture gate valves for all purposes, cast iron pipe (centrifugally cast or sand-cast), and fittings.



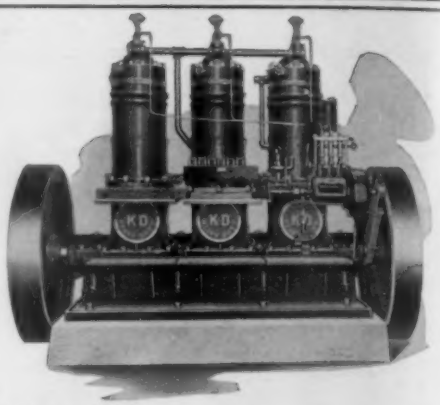
Bronze-Lined Hydrant

R. D. WOOD & CO.

ESTABLISHED 1803

PHILADELPHIA
PENNSYLVANIA

IT is perfectly logical that an increasingly large number of municipalities are selecting Anderson Diesel Engines for their electric light and water plants—they operate so dependably and economically.



WRITE FOR CATALOG 34-C.

IT TELLS ALL ABOUT THE FAMOUS

ANDERSON DIESEL ENGINES

of which thousands of horse power are in successful operation in light and water plants in all parts of the country.

ANDERSON ENGINE & FOUNDRY COMPANY

ANDERSON, INDIANA

New York, Chicago, New Orleans, Tampa, Kansas City, San Antonio, Bridgeport, O.

WHEN YOU BUY PIPE REMEMBER

CAST IRON PIPE NATIONAL IS MADE RIGHT

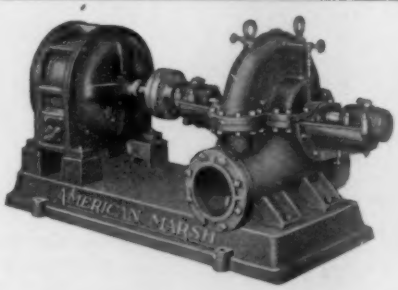
MADE BY SAND CAST AND DE LAVAUD CENTRIFUGALLY CAST PROCESSES

NATIONAL CAST IRON PIPE Co

BIRMINGHAM, ALABAMA

SALES OFFICES:

Chicago—715 Peoples Gas Bldg.
Kansas City, Mo.—603-04 Land Bank Bldg.
Dallas—1315 Sante Fe Building.
Los Angeles—903 Hellman Bank Bldg.



American-Marsh Centrifugal Water Works Pump

This type of pump has a capacity up to 2500 gallons per minute. It has many features that commend it to users who appreciate high grade equipment. Hydraulically balanced double suction impeller, horizontally split casing and bearings. Can be either belt driven or arranged for direct connection to any prime mover.

Write for Bulletin

AMERICAN STEAM PUMP CO.

Battle Creek, Michigan

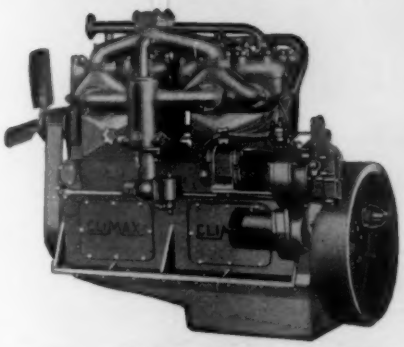
for Better Service from Any Make of Pump

Specify

CLIMAX

Trade Mark Reg. U. S. Pat. Off.

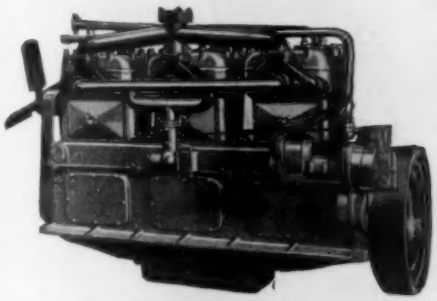
The "Trustworthy" Engine



FOR 750 GAL. PUMPS
Model R4U

Four Cylinder, 6"x7" Engine, equipped complete to Underwriters' Laboratories' requirements. Maximum speed 1200 R. P. M.

We furnish Engine alone, or for those who wish to secure a complete Unit, four selections are available.



FOR 1000 GAL. PUMPS
Model R6U

Six Cylinder, 6"x7" Engine, equipped complete to Underwriters' Laboratories' requirements. Maximum speed 1200 R. P. M.

We furnish engine alone, or for those who wish to secure a complete Unit, four selections are available.

Any Pump Manufacturer or his Agents will supply you with Climax Engines if you specify them. They know there is no more dependable power—and that Climax is the only Internal Combustion Engine that has been listed as Standard by Underwriters' Laboratories for driving multiple-stage Centrifugal Pumps of 750 and 1000 gallon capacities.

Listed as Standard by the UNDERWRITERS LABORATORIES

It costs you no more to have the added protection Climax power gives.

***Write for Bulletin* I**

CLIMAX ENGINEERING CO., 61 W. 18th Ave., Clinton, Iowa

Eastern Branch: 30 E. 42nd St., New York, N. Y.
Cleveland Branch: 657 Leader Bldg., Cleveland, Ohio
Chicago Branch: 2007 Harris Trust Bldg., Chicago, Ill.
New Orleans, La.: Woodward, Wight & Co. 451 Howard St.
Southwestern Branch: P. J. Dasey, Hotel Wells, Tulsa, Okla.
Los Angeles, Calif.: Coast Machinery Corp., 464-66 E. 3rd St.
San Francisco, Calif.: Coast Machinery Corp., 829 Folsom St.
Birmingham, Ala.: Keiser-Geismer Engr. Co., 1308-9 American Trust Bldg.
Boston, Mass.: Rapp-Huckins, 59 Haverhill St.
Denver, Colo.: The Hendrie & Bolthoff Mfg. & Supply Co., 1621-39 17th St.
Indianapolis, Ind.: Carl Dunning Supply Co., 204 W. Maryland St.
Jacksonville, Fla.: Construction Equipment Co., 437 East Bay St.
Madison, Wis.: Wisconsin Machine & Foundry Co.
Minneapolis, Minn.: Wm. H. Ziegler Co., 619 Washington Ave. S.
Portland, Ore.: J. L. Latture Equipment Co., 354 Belmont St.
St. Louis, Mo.: Tulley Equipment Co., 2339 Pine Street
Omaha, Neb.: Interstate Machinery & Supply Co.
Montreal, Que., Can.: Edward C. Dingman, 1005 Keefer Bldg.

Sterling

THE ENGINE OF RETIREMENT

What Can You Do With High Duty Gasolene Engines?

VISIT THE STERLING EXHIBIT AT THE POWER SHOW

GRAND CENTRAL PALACE, NEW YORK

December 6-11, 1926 **Third floor Space 446-447**

Quick starting, reliable emergency power for standby and peak loads. Drive generators, centrifugal pumps, tractors, bridges, air compressors, fans, sluicing pumps, irrigation pumps, fire protection systems, locomotives, passenger cars with Sterling.

In a few words, this is what happened:—Four lengths of 4-inch cast iron pipe jointed with

LEAD-HYDRO-TITE

were connected with city pressure of 65 pounds after being blocked twenty-four inches above the ground.

Then the center supports were taken away, causing a settlement of thirteen inches with NO LEAKS.

This test proves conclusively that LEAD-HYDRO-TITE makes a water-tight joint that will not leak no matter how far a pipe may settle.

Lead-Hydro-Tite is a black powder, not injured by age or dampness, which forms a hard metallic tight joint when melted and cooled.

ONE QUALITY — ONE PRICE

HYDRAULIC DEVELOPMENT CO.

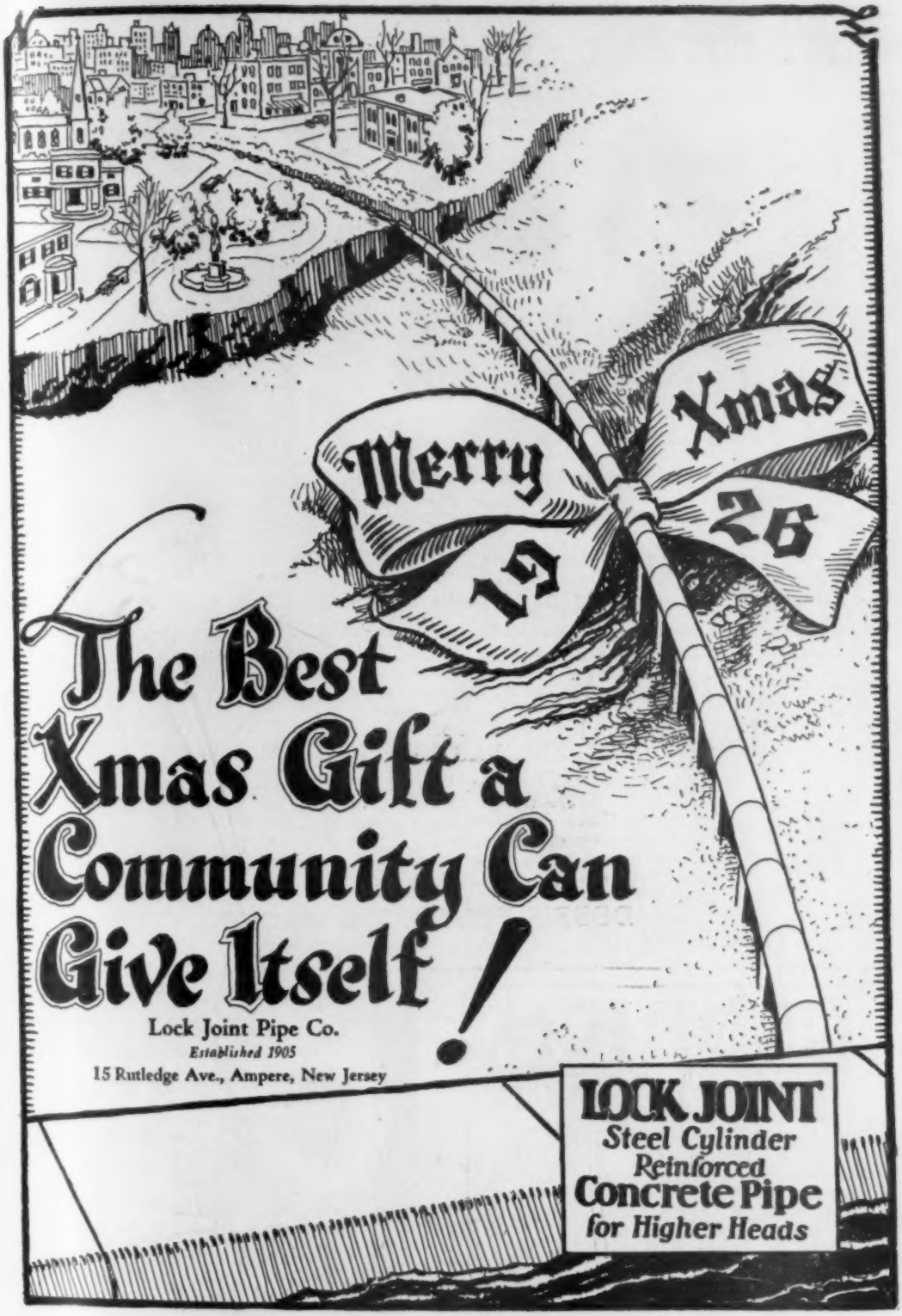
296 BOYLSTON ST., BOSTON, MASS.

FRANK L. NORTHROP
Vice-Pres.

G. DUTHIE-STRACHAN
President

H. A. HANSCOM
General Manager

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.


Merry
Xmas
19
26
The Best Xmas Gift a Community Can Give Itself!
Lock Joint Pipe Co.
Established 1905
15 Rutledge Ave., Ampere, New Jersey
LOCK JOINT
Steel Cylinder
Reinforced
Concrete Pipe
for Higher Heads

KELLY CONCRETE WELLS

Furnish More Water at Less Cost

The City of Wolf Point, Montana, had two wells of primitive construction, one new in 1917, the other in 1921. By the fall of 1925 these two wells had decreased in capacity more than 50% and were becoming a source of heavy expense to the city, in amount of power consumed and also repairs on the wells to keep them working. These facts led the City Officials to investigate the more modern types of wells and as a result they now have one Kelly Concrete Well, in which the first cost is the last cost. The new well when tested showed a maximum capacity of 1,200 G. P. M. and actually pumped 500 G. P. M. with a 14-foot draw down. After 60 days' use the City Officials reported that they had pumped the well at the rate of 600 G. P. M. with the same draw down and instead of pumping 18 to 20 hours per day with two pumps were pumping from 1 to 2 hours per day with 1 pump. This is only one of hundreds of similar cases where we have satisfactorily solved water supply problems—Our services are available for the asking—Write today.

KELLY WELL CO., INC.

KANSAS CITY, MO. GRAND ISLAND, NEBRASKA KALAMAZOO, MICH

SULKY DERRICKS

DOBBIE EQUIPMENT

FOR

WATER WORKS CONSTRUCTION

The Pick-Up Cart, for moving the material to the trench, and the Sulky Derrick to place the material, are great time-and-money savers in handling pipe, timber, sewer and water-works castings, etc. Let us send you our booklet.

PICK-UP CART

DOBBIE FOUNDRY & MACHINE COMPANY

NIAGARA FALLS, N. Y.

ALDRICH

THE ALDRICH PUMP COMPANY
No. 3 GORDON STREET
ALLENTOWN, PENNA.

REPRESENTATIVES WANTED

Single Suction
Double Suction
CENTRIFUGAL
Single Stage
Multi Stage

PUMPS

A. D. Cook, Inc.

Lawrenceburg, Indiana

Manufacturers of

DEEP WELL PUMPS

and

The COOK
PATENT BRASS TUBE
WELL STRAINER.

The offices of THE AMERICAN CITY, 443 Fourth Ave., N. Y., are headquarters for information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.

Nearing the North Shore, Showing the dredger, pile drivers and cradle.

U. S. Flexible Joint Pipe for Submarine Lines

The installation shown here was made for the Delaware River Water Company by Frederick Snare Corporation of New York and Philadelphia.

The line, which consists of 64 lengths of our 18″ Flexible Joint Pipe, was laid under adverse tide conditions at a maximum depth of 26′ at high tide.

Under the water pressure test only four small leaks developed and these were easily recaulked by a diver. The water was then pumped out and an air pressure of 125 lbs. per square inch put on the line and maintained without evidence of leakage anywhere.

Write for United States Cast Iron Pipe handbook—it contains descriptions of all types of flexible joint pipe.

United States Cast Iron Pipe and Foundry Company

General Offices:
Burlington, New Jersey

SALES OFFICES

Philadelphia: 1421 Chestnut St. New York: 71 Broadway
Chicago: 122 So. Michigan Blvd. San Francisco: 3rd & Market Sts.
Birmingham: 1st Ave. & 20th St. Pittsburgh: 6th & Smithfield Sts.
Buffalo: 975 East Ferry Street Dallas: Akard & Commerce Sts.
Cleveland: 1150 East 26th St. Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.

Silence!

This STOPS THE KICKS!

This Maxim Silencer is attached to the exhaust of a 60-h.p. Fairbanks-Morse Diesel engine. Hilton Storage Warehouse Company, Hilton, N. Y.

PEOPLE living near industrial plants operated by oil engines will stand the exhaust noise just so long.

Sooner or later they are bound to complain.

Yet, in many localities operators of oil engines have answered or forestalled such complaints by installing Maxim Silencers on the exhausts.

As a matter of fact, Maxim Silencers have more than once stopped injunctions.

THE MAXIM SILENCER CO.

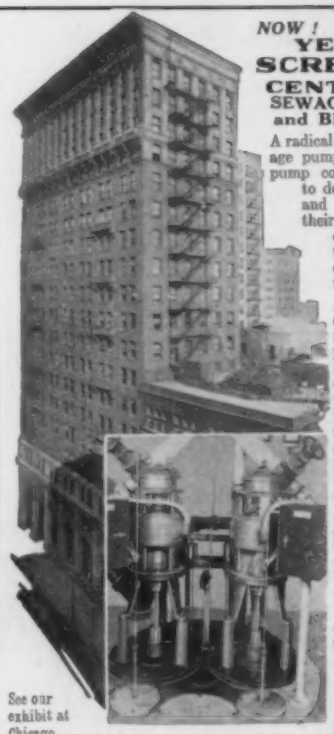
P.O. Drawer 2102 Hartford, Conn.

For oil and gas engines, air compressors, uniflow steam engines, positive pressure blowers, reducing and safety valves and other equipment having noisy intakes or exhausts, use

MAXIM SILENCER

For Industrial Purposes

Reg. U.S. Pat. Off.



NOW!

YEOMANS SCREENLESS CENTRIFUGAL SEWAGE EJECTORS and BILGE PUMPS

A radical development in sewage pumping equipment. A pump construction designed to do away with screens and the nuisance with their use. The product of years of constructive engineering, recommended for many types of buildings.

And—being presented by YEOMANS means tried and proved successful for months in actual operation. Satisfactory for several years in municipal plants and now performing successfully in a prominent Chicago loop public utility office building.

A well known Chicago public utility building equipped with a YEOMANS Duplex Bilge Pump without screens. Now pronounced a complete success after months of service.

See our exhibit at Chicago Power Show—Feb. 15-19. *Write for information*

YEOMANS BROTHERS COMPANY
1417 Dayton St. Chicago, Illinois.

Security Sewer Rods

Security Rods are made from second-growth hickory, with malleable iron couplings swedged or shrunk down very tightly on the curved places at end of sticks. Security couplings *cannot* come off.

Joint and unjoint easily and quickly—light weight—long runs easily made. No slack but lend themselves to all practical bends.

They cannot buckle or uncouple in the duct.

Send for Flyer No. 16

F. Bissell Company

812 Lafayette Street TOLEDO, OHIO

Tight!

for

Water Supply and Fire Protection

All joint-making materials unnecessary! . . . . . *Thousands of miles laid every year*

No bell holes to dig . . . No lead nor lead substitute nor any other joint-making material needed . . . Nothing to deteriorate . . . Nothing to work loose . . . Flexible, dependable—*joints as tight as the wall of the pipe itself.*

PIPE AND JOINT ARE "ONE"

The hub and spigot ends of Universal Pipe, machined at slightly different tapers, are drawn into direct contact forming flexible iron-to-iron joints that provide for expansion and contraction, vibration and uneven ground settlement.

Laid practically anywhere in any season.

Common labor can make the joints. Wrenches the only tools.

Address nearest office.

UNIVERSAL CAST IRON PIPE

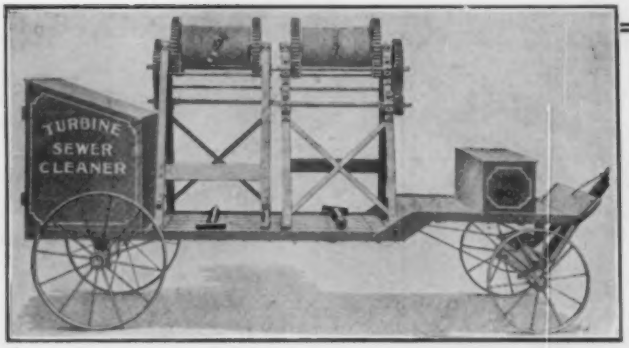
TIGHT : FLEXIBLE : DEPENDABLE

THE CENTRAL FOUNDRY COMPANY

Subsidiary of The Universal Pipe and Radiator Company

41 East 42nd Street, New York

Chicago Birmingham Dallas San Francisco

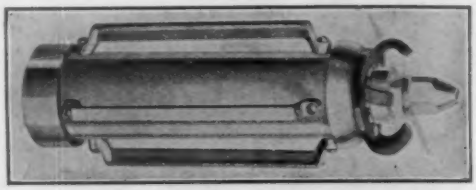


No Stopped Up Sewer is too difficult to yield to this TURBINE SEWER-CLEANING MACHINE

The Turbine will clean and scour a sewer under any and all conditions, even if stopped up to such an extent that a chain, cord or cable could not possibly be pulled through. To our standard machine we have added the Turbine Ferret, shown below, which has been used with great success in cleaning small stoppages, dead end connections, connections from catch basins to main sewers, and house drains.

The TURBINE SEWER-MACHINE CO.

MILWAUKEE, WIS., U. S. A.



Cast Iron Pipe
for Water and Gas

Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials.

Sizes 2- to 60-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

Warren Foundry & Pipe Co.
Formerly
Warren Foundry and Machine Co.
Sales Offices: Bowling Green Building, New York City. 201 Devonshire Street, Boston, Mass.

PUMPS

A Type for Every Service

Bulletins on request

GOULD'S PUMPS, INCORPORATED
SENECA FALLS, N. Y.

GOULDS

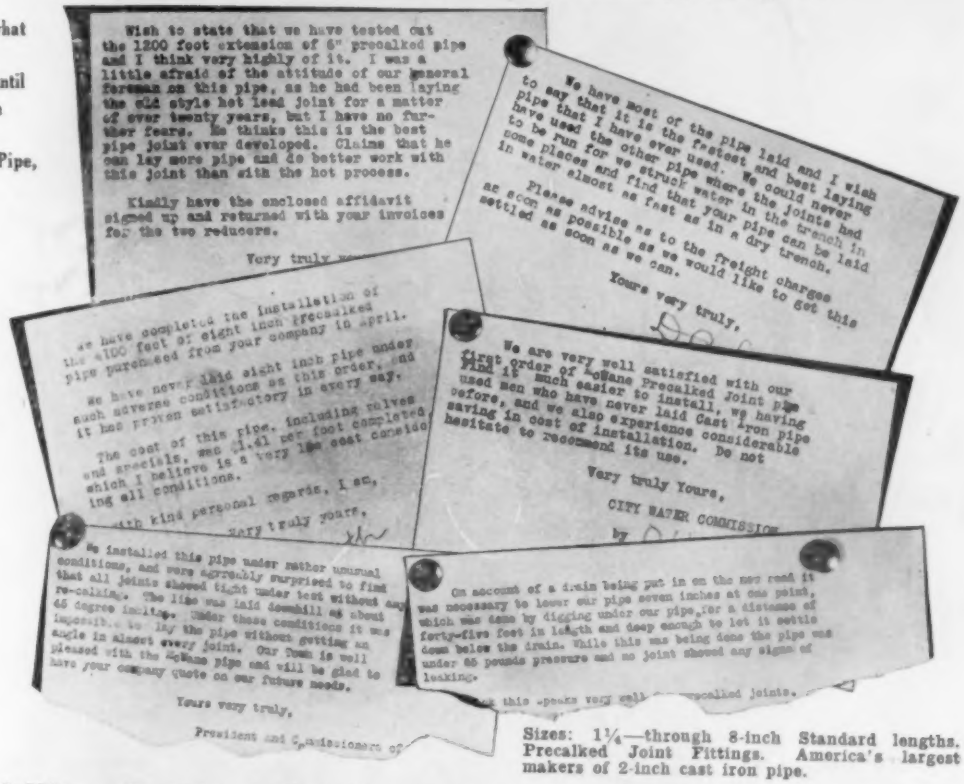
McWANE precalked CAST IRON PIPE

with the Factory-Made Joint

YOU TELL 'EM, CUSTOMERS!

—We're too busy making pipe.

This is what you are missing until you begin using McWane Pipe, too.



Wish to state that we have tested out the 1200 foot extension of 6" precalked pipe and I think very highly of it. I was a little afraid of the attitude of our general foreman on this pipe, as he had been laying the old style hot lead joint for a matter of over twenty years, but I have no further fears. He thinks this is the best pipe joint ever developed. Claims that he can lay more pipe and do better work with this joint than with the hot process.

Kindly have the enclosed affidavit signed up and returned with your invoices for the two reducers.

Very truly

We have most of the pipe laid and I wish to say that it is the fastest and best laying pipe that I have ever used. We could never have used the other pipe where the joints had to be run for we struck water in the trench in some places and find that your pipe can be laid in water almost as fast as in a dry trench.

Please advise us as to the freight charges as soon as possible as we would like to get this settled as soon as we can.

Yours very truly,

We have completed the installation of the 4100 feet of eight inch precalked pipe purchased from your company in April.

We have never laid eight inch pipe under such adverse conditions as this order, and it has proven satisfactory in every way.

The cost of this pipe, including valves and specials, was [illegible] per foot completed which I believe is a very low cost considering all conditions.

With kind personal regards, I am,

Very truly yours,

We are very well satisfied with our first order of McWane Precalked Joint pipe and it is much easier to install, we having used men who have never laid Cast Iron pipe before, and we also experience considerable saving in cost of installation. Do not hesitate to recommend its use.

Very truly Yours,

CITY WATER COMMISSION

by

We installed this pipe under rather unusual conditions, and were agreeably surprised to find that all joints showed tight under test without any re-caulking. The line was laid downhill at about 45 degree incline. Under these conditions it was impossible to lay the pipe without getting an angle in almost every joint. Our Town is well pleased with the McWane pipe and will be glad to have your company quote on our future needs.

Yours very truly,

President and Commissioners of

On account of a drain being put in on the new road it was necessary to lower our pipe for a distance of forty-five feet in length and deep enough to let it settle down below the drain. While this was being done the pipe was under 65 pounds pressure and no joint showed any signs of leaking.

this speaks very well precalked joints.

Sizes: 1¼—through 8-inch Standard lengths. Precalked Joint Fittings. America's largest makers of 2-inch cast iron pipe.

McWane Cast Iron Pipe Company — **Birmingham, Ala.**

819 Bankers Trust Bldg., Philadelphia, Pa.
1807 Santa Fe Bldg., Dallas, Texas
422 Central Bldg., Los Angeles, Calif.
208 S. La Salle St., Chicago, Ill.

Why build sewers more than once?

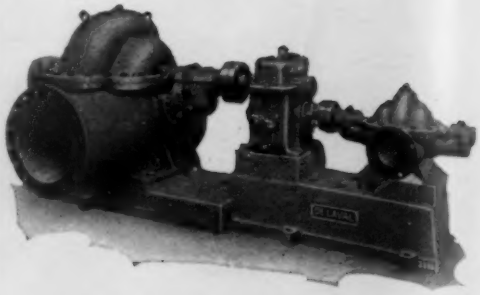
BUILD sewers with Vitrified Salt-Glazed Sewer Pipe, and you build them for the last time. Replacement is never necessary. Clay pipe resists surface water, sewer acids, and ground chemicals—forever.

Clay Products Association

Chamber of Commerce Bldg.
Chicago

VITRIFIED CLAY
Sanitary Sewer Pipe

AC12-Gray



Better Than Steam
OR
Electric Auxiliary Drive

WATER-WORKS plants frequently install small turbines or electric motor drives for pumps circulating condenser water and other low head or low power pumping. DE LAVAL HYDRAULIC MOTORS can, however, usually be substituted with a considerable saving in first cost and power cost.

The overall efficiency of the hydraulic turbine drive from steam throttle to water pumped, when operating on water pumped by the high efficiency main pumping unit, is in most cases appreciably higher than is possible with a small steam turbine or motor drive.

The photograph shows a De Laval unit consisting of a 20-H.P. Water Turbine running at 1840 RPM. and driving through a Helical Gear, an 18-in., single-stage pump designed to deliver 8600 gals. per min. against 10-ft. head at 390 RPM. The pump lifts water from the main reservoir to the filters, from which it runs to a clear well supplying the high duty main station pumps, which force it into the city mains. A tap is taken from the latter for the water turbine, which discharges back into the clear well.

De Laval equipment and experience assure the most economical solution of your pumping problems, whether steam, electric or hydraulic power be used.

Ask for Catalog B-64.

De Laval
Steam Turbine Company
Trenton, New Jersey

LOCAL OFFICES: Atlanta, Boston, Charlotte, Chicago, Cleveland Denver, Duluth, Boston, Helena, Indianapolis, Kansas City, Los Angeles, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Portland, Ore.; St. Paul, Salt Lake City, San Francisco Seattle, Spokane, Toronto, Vancouver. 567

Manufacturers of Steam Turbines, Centrifugal Pumps, Centrifugal Blowers and Compressors, Double Helical Speed Reducing Gears, Worm Gears, Hydraulic Turbines, Flexible Couplings and Special Centrifugal Machinery.

Announcing the Non-Clogging Centrifugal Pump

THE new "American" Non-Clogging Centrifugal Pump marks a new stage in non-clogging pump construction. The impeller in this pump is so designed that the stream lines are not separated, but so the stream of fluid is kept in one mass and carried through the pump without being subdivided. This obviates the necessity for screening sewage or fluid containing other material before pumping.

Fluids containing stringy matter, mineral matter, animal matter and vegetable matter, such as hair, string, waste, shavings, rags, mud, chips, sand, sludge, wire, debris, slaughter house and fish market refuse, offal, fat, grease, weeds, straw, stable sweepings, etc., can be handled without the aid of screens and their expensive maintenance.

This pump is made in both vertical and horizontal types and is adapted for municipal sewage and general industrial use. Engineering information is available. Ask for it.

Patent applied for

DISTRICT SALES AGENCIES:

Boston, Mass.
Detroit, Mich.
Tulsa, Okla.
Denver, Colo.
St. Louis, Mo.
Salt Lake City, Utah
Vancouver, B. C., Can.
Omaha, Neb.
Birmingham, Ala.
Joplin, Mo.
Atlanta, Ga.
Jacksonville, Fla.
Charlotte, N. C.
Pittsburgh, Pa.
Roswell, N. M.
Philadelphia, Pa.
Kansas City, Mo.
St. Paul, Minn.

BRANCH OFFICES:

Chicago, Ill.
1615 First Nat. Bank Bldg.

Dallas, Texas
820 Fidelity Union Bldg.

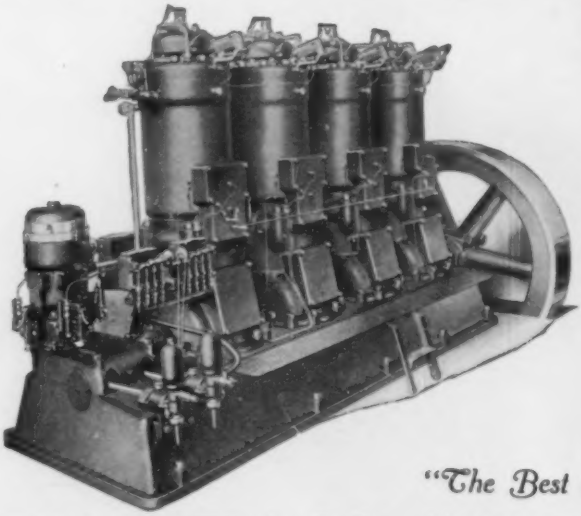
New York, N. Y.
Room 523—165 Broadway

San Francisco, Calif.
635 Mission St.

Los Angeles, Calif.
420 E. Third St.

THE AMERICAN WELL WORKS

General Offices AURORA, ILLINOIS *and Factory*



BOLINDERS
(PATENTED)
OIL-ENGINE

Chief advantages:
Low working pressure
Solid injection
Quick Starting
Full automatic control at all loads
Clean combustion
Low fuel consumption
Absence of complicated parts
Low upkeep costs

Sizes:
6 to 900 H.P.

Over 1,000,000 H.P. in operation

Our new Stationary Low Pressure Oil Engine pictured herewith has several features, superior to those of other engines of this type on the market. Let us send you our bulletin describing it.

"The Best the World Produces"

BOLINDERS CO., INC., 33 Rector St., N. Y.

Engines and Parts in Stock—Service Dept.

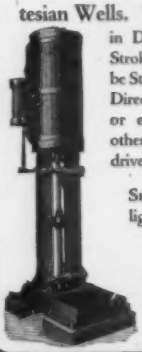
AUTHORIZED DEALERS

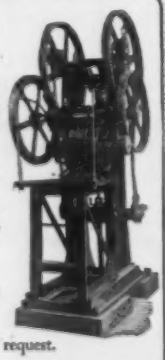
Stauffer, Eshleman & Company, Ltd., New Orleans, La.
Earl F. Scott & Co., Atlanta, Ga.
Warren G. Myers & Co., Charlotte, N. C.
Lewis-Brown Co., Inc., Helena, Ark., & Memphis, Tenn.
The D. June Machinery Company, Waco, Texas
Southern Machinery & Supply Co., Montgomery, Ala.
Pacific Coast Representative
Richard Froboese Co., Seattle, Wash.

TRADE MARK
DOWNIE
REGISTERED U. S. PATENT OFFICE

DEEP WELL PUMPS

Downie Deep Well Pumps are offered for Heavy, Continuous Service in Deep Artesian Wells. They are built in Double and Single Stroke Models and may be Steam Driven, Belted, Direct Geared to Motor, or equipped for any other standard form of drive.





Smaller Pumps for lighter service.

Catalog No. 6 on request.

Downie Centrifugals, single and multi-stage, Catalog 801.

Keystone Driller Company

170 Broadway, New York Monadnock Block, Chicago Joplin, Mo.

Beaver Falls, Pa.

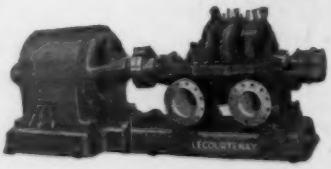
INTERNATIONAL
GRAVITY FILTRATION PLANTS

THROUGH the years, the International Filter Co. has been the first to adopt improvements—the first to discard features that have proved hindrances of progress. The result has been that International equipment has maintained its leadership; that it is first now as always.

INTERNATIONAL FILTER CO.
Water Softening and Filtration Plants
Works and General Office: 333 West 25th place, Chicago

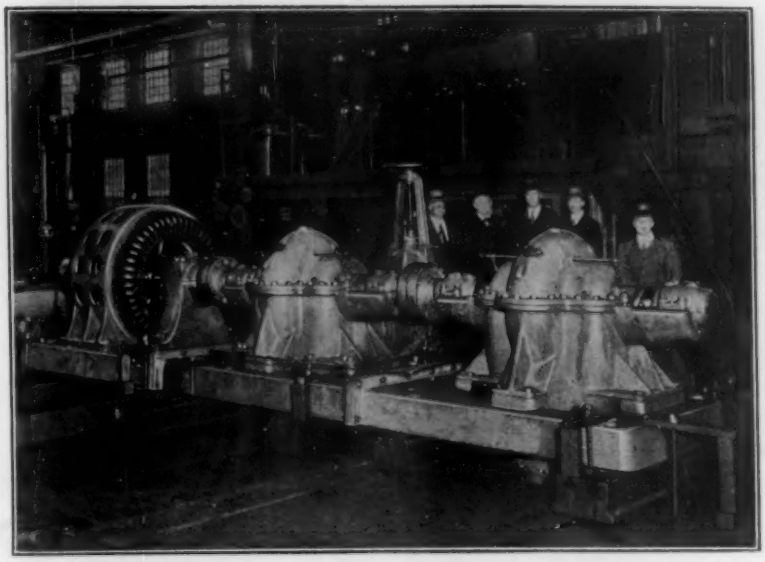
New York Pittsburgh San Francisco
Canadian International Filter Co., Ltd., Toronto

LECOURTENAY PUMPS
Centrifugal



Pumping machinery for every kind of pumping service.

LECOURTENAY COMPANY
8 Maine Street, Newark, N. J.



DESERVING OF YOUR CONFIDENCE

Allis-Chalmers pumping machinery has long been noted for record-making performance. The pumping unit shown being tested in the shop is one of three twenty million MGD against 225 foot head Allis-Chalmers combined motor driven centrifugal pumping units for the New Fridley Pumping Station, Minneapolis, Minnesota. Unusually high efficiency was specified (all manufacturers could not guarantee the efficiency desired) but our shop tests which were witnessed by the Purchaser's Engineers showed the guaranteed performance will be bettered by the units being furnished. Allis-Chalmers has the reputation of deserving the confidence placed in its pumping machinery.

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

A Responsibility of Every City

Protecting public health—that is the responsibility of every city, large or small. Sanitary drinking fountains should be regarded as a public utility of daily service.

Install Rundle-Spence Vertico-Slant Fountains in all public places. Positive drinking sanitation will be automatically enforced — *lips can't touch the R-S nozzle.* The possibility of contamination arising from lip-contact will be eliminated. Everyone *must* drink sanitarily from a R-S "health bubbler."

All types of Sanitary Drinking Fountains, Bath and Plumbing Fixtures and Supplies are included in the R-S line.

Write for catalog which contains complete information.

RUNDLE-SPENCE MFG. CO.
53 Fourth St. Milwaukee, Wis.

RUNDLE-SPENCE

WAMBLU
"Marks the World"

Write now for sample "SLOW DOWN," 'SCHOOL ZONE," or other desired marking in the high-visibility WAMBLU self-vulcanizing Letters, Strips and Arrows for Simplified Traffic Control.

Adopted in 1926 by many large cities as well as towns and villages all over the U. S.

WAMBLU CORPORATION
Sole Mfrs. (Patents Pending)
1260-1290 Ridge Rd. Rochester, N. Y.

NOTE—In ordering samples, please mention whether use is for pavement, top of curb, sidewalk, walls or roofs.

Lamp Posts

Service Boxes

Valve Boxes

Write for Prices & Complete lighting Catalogue

The Casey-Hedges Co.
Chattanooga, Tenn.

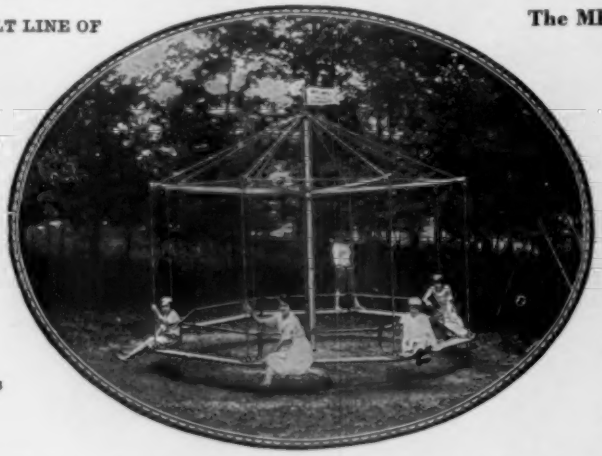
Over a Quarter of a Century devoted to the development and manufacture of Childrens Outdoor Health Building Goods— EXCLUSIVELY
THE FUN FUL LINE
PLAYGROUND EQUIPMENT
PLAYGROUND EQUIPMENT
HILL-STANDARD CO.
ANDERSON, IND., U.S.A.
EST. 1900

MITCHELL

"BETTERBILT" PLAYGROUND APPARATUS

THE BETTERBILT LINE OF

Merry Whirls
Swing a Rounds
Swing Bobs
Pedo Swings
Settee Swings
Teeter-Totters
Slides
Water Slides
Frame Swings
Kiddie Whirls
Porch Swings
Lawn Swings
Horizontal Ladders
Etc., Etc.



The MERRY WHIRL

accommodates 1 or 50 children at a time and gives them the best of exercise all the year around.

Safe, strong and neat in appearance.

Send for Catalogue No. 11.

MITCHELL MANUFACTURING COMPANY

1300 - 29th AVENUE -:- MILWAUKEE, WISCONSIN

GREETINGS

WE wish at this time to extend greetings and to express our hearty thanks to all of our old friends who have favored us with their business and to extend to all City Officials interested in better parks and public grounds an invitation to become acquainted with BAUSMAN BETTER BENCHES AND SWINGS.

BAUSMAN MANUFACTURING COMPANY

MILLERSVILLE, PENNA.

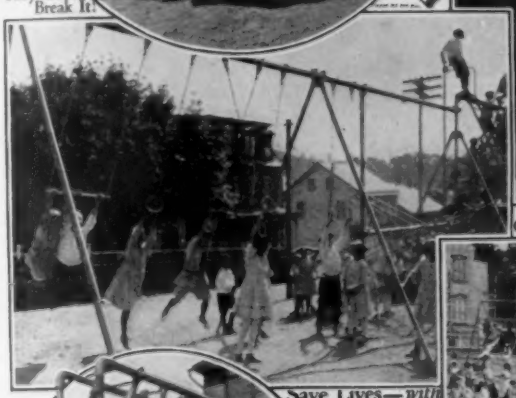
BENCH MAKERS FOR MORE THAN A QUARTER OF A CENTURY

Making Friends for EverWear

They Can't Break It!

PLAYGROUND EverWear APPARATUS

Out of Danger! Build Playgrounds! Save Lives! EverWear Stands Up



Save Lives—with EverWear

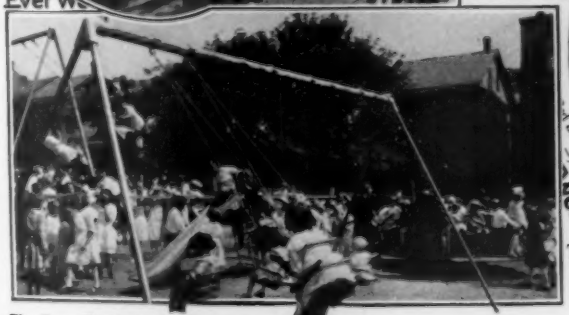
Year After Year!

EverWear

A Bloodied Healthy Kid

There's No Danger of it's EverWear

Out of Danger! Playing on EverWear



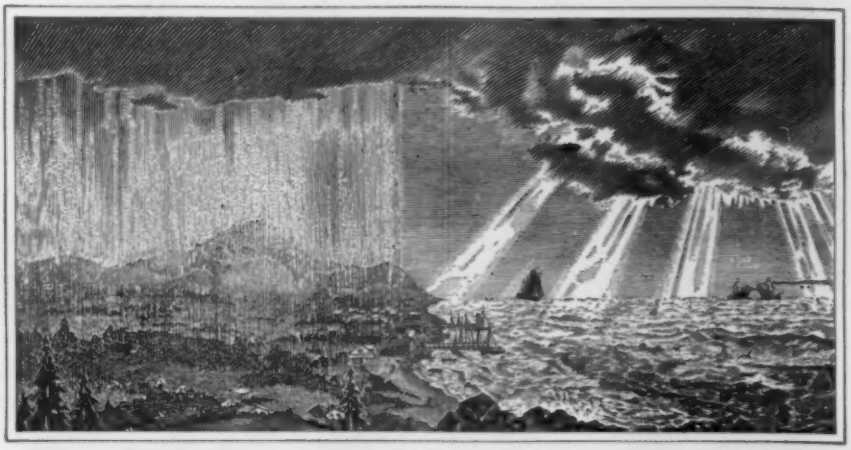
The Great Teacher said, *"Suffer little children to come unto me."*

In all reverence may we say, Playgrounds will make the pathway easier.

Write for the beautiful, illustrated EverWear Catalog.

The EverWear Manufacturing Company

SPRINGFIELD, OHIO



Rain and Telephone Calls

THE annual rain fall in the United States would weigh over three and one-half trillions of tons.

This vast weight is drawn up to the clouds by the unseen but effective power of the sun; representing energy equivalent to 300 billion horse-power.

The annual telephone conversations total over twenty-five billion a year. As silently as sunlight, electricity, mastered by the human mind, carries the voices of the nation.

There must be the man-power of 300,000 individuals to build, maintain and operate the telephone system.

There must be the money-power of over seven hundred million dollars a year to pay for operating the plant, in addition to three billion dollars invested in the plant.

The rain sustains life; the telephone furnishes swift communication for the nation, and they are alike in requiring a vast amount of unseen energy.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

IN ITS SEMI-CENTENNIAL YEAR THE BELL SYSTEM LOOKS FORWARD TO CONTINUED PROGRESS IN TELEPHONE COMMUNICATION

Why Don't YOU do something about it?
This book shows how~ it's Free~ write today for booklet 7-A
TOKHEIM OIL TANK & PUMP CO.
FORT WAYNE, IND
Autos Take Fifty-five Lives a Day
CHICAGO, May 20 (U.P.)—Fifty-five persons were killed daily by automobiles during the month of April, statistics compiled on accident figures received by C. E. Robb, statistician of the national safety council, revealed today.
The number of persons killed during April is an increase of 13 over March and 18 over February.
TOKHEIM
CONTROL SIGNALS for EVERY TRAFFIC CONDITION
CAUTION
SIGNAL DIVISION
TOKHEIM OIL TANK & PUMP COMPANY
FORT WAYNE, INDIANA
TOKHEIM
"You Can't Buy a Better Traffic Signal TO SAVE YOUR LIFE"

"They found that a new system could be installed with an upkeep of just about half the cost of the old system."

King Street, Charleston, S. C., with its new G. E. Ornamental Novalux Lighting Units, on Elreco brackets.

NOW Charleston finds itself cleaned up and illumined by an Elreco installation—and it has proved a stroke of economy. "About half of the previous upkeep"—writes one of the leading business men.

To Charleston we extend congratulations—to other cities represented among the readers of this magazine we offer suggestions for better municipal lighting.

Fewer poles make neater streets and that is an advantage of using Elreco Combination Poles. Fewer poles are achieved in two ways: Elreco Combination Poles eliminate the need of other poles for other uses. String trolley wires from this lamp standard. Hang traffic lights on it. Make it serve all the purposes of public poles and you clear up the curb-line. Set your lamps at the proper heights on these sturdy steel supports, and you can often do better lighting with fewer lamps and fewer lamp standards.

Upkeep must be taken and sanely weighed in a sincere investigation of economy of overhead wiring against the meritorious systems. So contrast the hidden trials of underground lighting circuits.

But ask us for the rest of the important facts that only our thirty-two years' experience can give you.

THE ELECTRIC RAILWAY EQUIPMENT COMPANY

Cincinnati, Ohio

New York Office — 30 Church Street

ELRECO

POLES

DAVENPORT

MOLINE

ROCK ISLAND

When the rival Tri-Cities agreed

The friendly rivalry among the Tri-Cities along the Mississippi River—Davenport, Moline, and Rock Island—extends throughout many phases of local activity. Each is continually striving to excel the others.

But when it came to selecting ornamental lighting units for their white ways, the Tri-Cities unanimously agreed upon the G-E Ornamental Novalux Unit as the one that would best fulfill their lighting requirements.

These units—of which Davenport has 364, Moline 206, and Rock Island 167—provide all the white-way illumination of these three progressive Mid-West cities.

A G-E Street Lighting Specialist has information that is most valuable in selecting the correct lighting unit for your streets. He is available through your local G-E Sales Offices.

720-12

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

TYPE OF INSTALLATION AT
ASBURY PARK, N. J.

CATALOGUE ON REQUEST

HORNI SIGNAL MFG. CO.

183 Varick St. **New York City**

L. B.
Special Alloyed Aluminum
ILLUMINATED OR NON-ILLUMINATED
Traffic Stop Signals

Fitted with 6-in. Ruby Lens

In natural aluminum or baked enamel, in standard colors. 1,500 of our signals in Chicago alone.

LB STREET MARKERS

Will not corrode or deteriorate.
Attractive and Practical.
EVERLASTING
First cost the only cost
Circular and Prices on Request.

LEITELT BROTHERS
7725 So. Chicago Ave. **Chicago, Ill.**

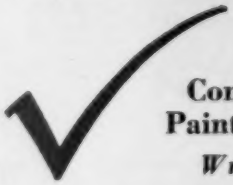
Free Book

Send for a free copy of our Revised Street Marking Handbook containing blue prints and instructions for street and highway marking.

The Tropical Paint & Oil Co.

Originators of High Visibility Yellow
1236-78 W. 70th St., Cleveland, O.

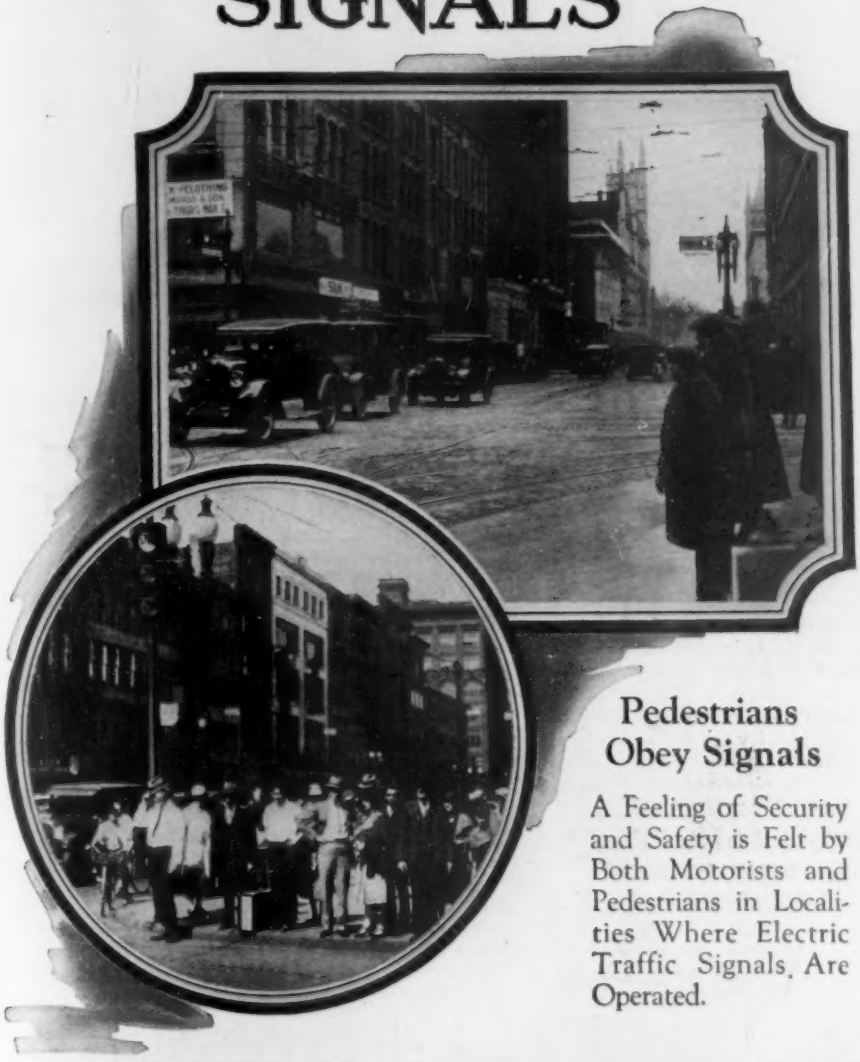
1927 Budgets



Should include a Continental Zone Painting Machine
Write today!

The Continental Products Co.
Dept. A **Euclid, Ohio**

ELECTRIC TRAFFIC SIGNALS



Pedestrians Obey Signals

A Feeling of Security and Safety is Felt by Both Motorists and Pedestrians in Localities Where Electric Traffic Signals Are Operated.

CROUSE-HINDS COMPANY
ESTABLISHED 1897
SYRACUSE, N. Y., U. S. A.
Sales Offices
NEW YORK · BOSTON · CHICAGO
PHILADELPHIA · PITTSBURGH · DETROIT · CINCINNATI · CLEVELAND · ATLANTA · ST. LOUIS · SAN FRANCISCO · MINNEAPOLIS · MILWAUKEE

CH 285

A STRICTLY PERMANENT SIGN SPEAKS FOR ITSELF

"Nothing that I have done for the city has created more favorable comment than the recent installation of the EVERNU SIGNS. We shall buy liberally next year."

Commissioner.
(Name furnished on request)

The Evernu-Century Sign Co.

100 Colonial Road Boston (Brighton), Mass.

Manufacturers of the EVERNU STREET SIGNS, the WIRELESS ELECTRIC BEACON and BOULEVARD STOP SIGNS.

ALUMOYD TRAFFIC SIGNS
ROADPILOT—THE IMPROVED REFLECTING SIGNAL

Street Signs
Zone Markers
Direction Signs
Highway Markers Etc.
All Castings of Special Alloyed Aluminum

Write for Catalog and Prices.

THE AUTOMATIC SIGNAL AND SIGN CO.
Michigan at 11th St., Chicago, Ill.

DAY AND NIGHT

Our factory is running day and night filling the largest single order ever placed with any concern for parking signs and holders.

HOWEVER

This doesn't mean that we can't give your order or inquiry prompt and intelligent attention.

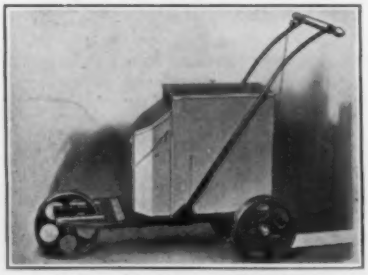
Send for our handsome catalog on Street Signals, Standards and Parking Signs. It is free!

ROCHESTER STREET SIGNAL CO.
400 WARD BLDG.
ROCHESTER, N. Y.

R. B. Electric Dryer
for
Swimming Pools
Safe
Sanitary,
Saves Towels
Increases Patronage

H. W. KEEBLER MFG. COMPANY
422 FIRST AVENUE PITTSBURGH, PA.

LINE-O-GRAPH



Highway Marking Machine

For Painting

SAFETY

Dangerous Curves
Safety Zones
Parking Spaces
Street Crossings

Operated by one man, does away with Brushes, eliminates all hand-painting, marks with any kind of Highway Paint, makes perfect lines on any pavement.

THE LINE-O-GRAPH CO.
Factory: Yonkers, N. Y. 17 E. 42nd St., New York City

Where there's REAL Traffic Control—you'll find ESSCO!

IF the responsibility of selecting the right traffic control system rests upon your shoulders—consider the following: ESSCO Systems are the choice of large cities—

—because ESSCO systems offer you a wide variety of types of signals to exactly fit your local needs.

—because ESSCO Systems are ADAPTABLE to all local traffic control problems.

—because ESSCO Systems give HIGH VISIBILITY with a greater measure of SAFETY.

—because ESSCO Systems require no attention and are extremely simple to operate.

—because ESSCO Systems are simply but scientifically designed to properly perform an unfailing traffic service.

—because ESSCO Systems are built of the finest, most durable material to be had.

A FEW CITIES THAT USE ESSCO

—

Chicago, Ill.
Philadelphia, Pa.
Oakland, Cal.
Louisville, Ky.
Jackson, Mich.
New Orleans, La.
Richmond, Va.
Steubenville, O.
Terre Haute, Ind.

AND MANY MORE

Ask about Essco—*today!*

Essco Manufacturing Co.

Peoria, Illinois

ESSCO Traffic Control SYSTEMS

Every Danger Point on the Road can be Guarded by an INTERFLASH!

THE ONLY POSITIVE DAY AND NIGHT SIGNAL

ALONG the road there are "dangerous corners," "sharp turns" and that greatest of hazards—the railroad crossing. At such points safety demands a positive warning day and night.—An Interflash Traffic Signal will give such protection by its flashing beam.

Write Today for Full Particulars

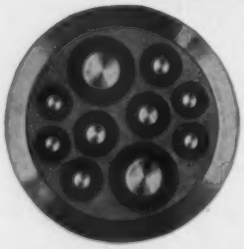
Interflash signs are built to standardization requirements. By day their words and symbols show black on a yellow background; at night the words and symbols of the signals flash yellow.

INTERFLASH SIGNAL CORPORATION 120 BROADWAY NEW YORK CITY

Hazard Parkway Cable

Hazard
RUBBER INSULATED
WIRES & CABLES

Parkway Cable for Use Underground Without Conduit



Spiral-Weave Cable for Use Overhead

Hazard Spiral Weave Cable

HAZARD LEADENCASED CABLE

FOR USE UNDERGROUND WITH CONDUIT

"MADE FOR USERS WHO WANT THE BEST"

HAZARD MANUFACTURING COMPANY

Wilkes-Barre, Penna.

New York Chicago Pittsburgh Denver Birmingham Philadelphia

THE ONE *COMPLETE* TRAFFIC SIGNAL

An Amber light—

A gong—

Red or green lights—

"STOP" or "GO"—

Street names for convenience—

Four lights for use when regulator operations are suspended—

And the mechanism high up and out of harm's way.

A Special Feature—

PROGRESSIVE SYNCHRONIZATION

The Argus Automatic Traffic Regulator is a boon to the motorist, who—to put it mildly—does not like to be stopped at crossings. With the Argus timing system, the motorist is enabled to make a run of several miles without a stop, providing he maintains the prescribed average rate of speed. The Argus can be made to suit the traffic demands of any hour, because of its many timing combinations—changed as simply as changing the disc on a phonograph.

If desired at any time, the Argus can readily be converted into a manually operated signal.

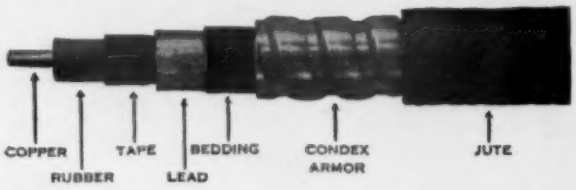
Let us send you complete description

BOYLE & WHITE, SOLE AGENTS

ARGUS AUTOMATIC TRAFFIC REGULATOR

52 LEXINGTON AVE., PASSAIC, N. J.

CONDEX PARK CABLE



The flexible, locked steel conduit is a steel tape applied spirally around the lead-covered conductor. This steel armor and the unique way in which it is applied form the main distinguishing feature of CONDEX Park Cable. The steel completely covers the cable under all conditions and is securely locked together in such a way that there is little possibility of any portion of the cable ever becoming exposed to mechanical injury. The arch effect of the overlapping, interlocking steel gives unusual resistance to crushing.

The same careful workmanship goes into CONDEX Park Cable and the same high standard of quality is maintained that characterizes other well known Simplex products. It stands in the same class with FIBREX Tree Wire and TIREX rubber-sheathed cords and cables.

SIMPLEX WIRE & CABLE Co

MANUFACTURERS

201 DEVONSHIRE ST., BOSTON

CHICAGO SAN FRANCISCO NEW YORK
CLEVELAND JACKSONVILLE

EASY to see, and HARD to beat—for

Reliability and Durability

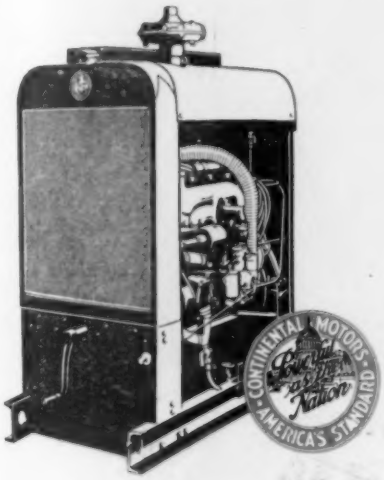
Write for our illustrated folder

Elkhart Foundry & Machine Co.

Elkhart, Indiana

The Lehman Traffic Guide

Power for a ~ thousand uses



Dependable Power For Every Purpose

Where industry functions, power has a place.

Wherever gasoline power is used, Continental Motors are outstanding for dependability, economy and proper design.

Road building, lumbering, plant construction, railroading and material handling—these are among the few of their thousands of uses.

26 years of specialized experience is one reason for Continental's present leadership in the industrial power field.

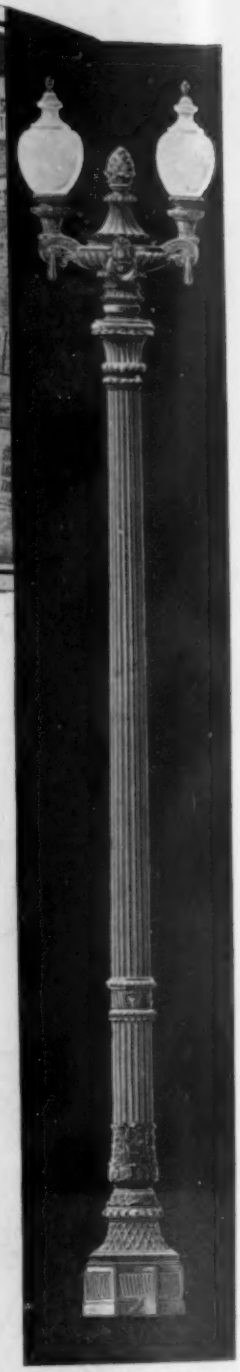
CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A. *Factories:* Detroit and Muskegon

The Largest Exclusive Motor Manufacturer in the World

Continental Motors

STATE ST. CELEBRATES NEW LIGHTS
STATE STREET AGLOW
When Thousands Saw Lamp Night Turned Into Day
STATE STREET, Lake Street to Van Buren
CHICAGO



The Newspapers of the Country Proclaim UNION METAL on State St.

Heralded in the headlines of newspapers throughout the country, the latest and greatest Union Metal installation on State Street, Chicago, was opened in a blaze of glory by President Coolidge. Over one million people attended the celebration.

Chicago turned out en masse to see this White Way which is three times brighter than any other in the world—so bright that a newspaper may be read at any point along the sidewalk.

The people of Chicago, the State Street Merchants' Assn., The Commonwealth Edison Company and the Chicago Surface Lines have a right to be proud of their combined achievement.

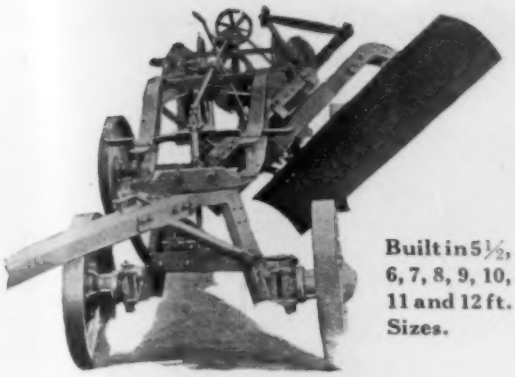
It is one of the sights of the world, and we, too, are proud of our place in bringing this White Way into being.

Send for your copy of Book No. 52 "Better Street Lighting". It explains in detail why Union Metal Lamp Standards have been selected by thousands of cities and towns in search of "The Right Way for Their White Way."

THE UNION METAL MANUFACTURING CO.
General Offices and Factory, Canton, Ohio
Chicago Office—230 South Clark Street

UNION METAL
LAMP STANDARDS

Union Metal Design No. 2700 equipped with two General Electric Form 12 Novalux units. This particular design is used both as an ornamental street lighting unit and ornamental trolley pole—eliminating the necessity for a great variety of poles along the curbing. Lamp Standard design approved by John T. Miller, Commissioner of Gas and Electricity City of Chicago.



Built in 5½, 6, 7, 8, 9, 10, 11 and 12 ft. Sizes.

THE GRADER of TODAY

THE "ROME" HIGH LIFT GRADER is a new and interesting development and a decided advance in the construction of this type of road-building machinery. It has **exclusive features,** patents on some of which have already been allowed.

THE "ROME" HIGH LIFT GRADER

is so designed that a 50-degree angle can be obtained on the mouldboard, thus making a practical bank sloper without additional cost or attachments. Aside from cost, extra parts have to be transported from place to place and are often at the other side of the county when needed. With the ROME Grader it is not necessary for the operator to leave his platform. In a very short space of time he can set the machine in a sloping position and can do this additional work quickly and efficiently.

Frame—Made from heavy structural steel I-beams, rigid and strong and yet flexible enough to adjust itself to road irregularities. Adequate in weight and perfectly balanced.

Steering Gear—Rome Patented Knuckle and Spindle type, the same as used on automobiles and motor trucks. It is specially designed so the grader can also be guided with the pole.

Pole—The combination steering, horse and tractor pole is made from pressed steel and so constructed that it can be telescoped, making a stub tongue or pole for engine use.

Wheels—This is a new departure, a new type of disc wheel made from ¼" steel boiler plate, properly concaved for strength.

Axles—Front axle cast steel; rear axle high carbon alloy steel; the spindles machined from the solid on each end.

Circle and Knees—Made from high grade carbon steel in double sections bolted together with spacers. A strong and rigid construction. Holds the mouldboard steady and leaves no waves in the finished work.

Mouldboard is of carbon steel made rigid by heavy reinforced angle iron bolted to the back. Cutting edge is from high carbon steel ground and polished and with a beveled cutting edge.

Gears—All gears have cut teeth and are enclosed in oil-tight gear cases running in a bath of oil. Worm screws are hammered forgings with cut teeth.

Lubrication—Alemite system throughout.

These graders are built in our locomotive department by skilled mechanics and with facilities fully adequate for producing first class machines.

OPPORTUNITY FOR DISTRIBUTORS

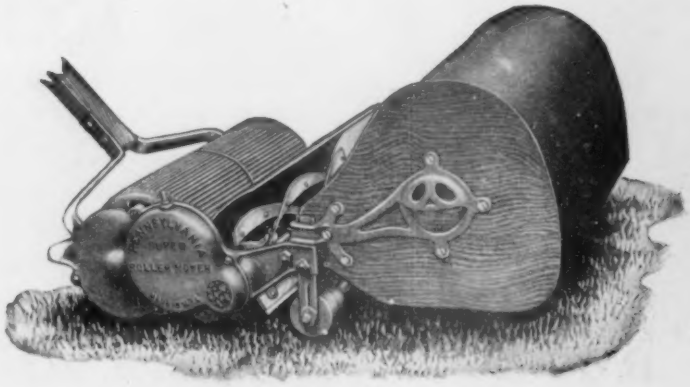
ROME Graders afford a real opportunity for live and energetic distributors. Territory is rapidly being taken up, but there is still some available.

See our exhibit at the Road Show, The Coliseum, Chicago, January 10th to 14th, 1927.

Write us for further information, prices, etc.

ROME MANUFACTURING COMPANY

ROME, NEW YORK **Dept. 2.** U. S. A.



Received With Real Enthusiasm

ALREADY the new Pennsylvania SUPER Roller Mower for tennis courts and golf greens is in enthusiastic demand among Park Executives.

The SUPER Roller Mower is the result of two years of research and a thorough study of the problem of close, uniform mowing as required on the modern golf greens. It cuts absolutely without ridging and, because of its light weight, saves both time and labor. One size only, 18-inch cut. Weight only 55 lbs. Price $60 at Philadelphia.

We shall be glad to send you a copy of our big new catalog showing the complete Pennsylvania line of mowers for public parks and golf courses.

Pennsylvania Lawn Mower Works

1615 North 23rd Street, Philadelphia

PENNSYLVANIA

Quality

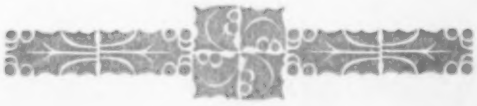
LAWN MOWERS

"REJOICE FOR IT IS CHRISTMAS - REJOICE"

ON the first Christmas Eve—nearly two thousand years ago—the Three Wise Men followed the Star of the East. Perpetuating this epochal event mankind has since, regularly and sincerely, observed the anniversary of the first Christmas.

In an endeavor to evidence our understanding of the "brotherhood of man" we pass on to you our hearty and cordial good wishes, in the simple though meaningful wish—A Real Merry Christmas To You.

NEPTUNE METER COMPANY



State Road, North of Dyer, Ind.

Lincoln Highway Detour, South of Dyer, Ind.

THE TWO ROADS shown in the above photographs are examples of the results that can be obtained, at very low cost, by the use of Stanolind Cut Back Asphalt for Cold Surface Treatment.

These roads, before treatment, were worn and irregular old asphalt macadam roads. When improvement was started, the road was first prepared by filling in all bad ruts and depressions with a mixture of Stanolind Cut Back Asphalt for Cold Surface Treatment, and well graded stone. This mixture was used cold, and was thoroughly compacted into place.

The Surface Treatment consisted of two applications of Cut Back Asphalt, applied cold, and one application of clean, well graded, washed limestone.

The first application of asphalt was made at the rate of one-tenth gallon per square yard, after the roadway had been cleaned and freed of dust.

The application of stone consists of about twenty pounds per square yard. The stone was dragged until it had developed into a true surface, filling in all exceedingly low areas.

The second application of asphalt was then made at the rate of about fifteen-hundredths of a gallon per square yard.

Heavy traffic was admitted to the road twenty-four hours after the work had been done.

The cost of this kind of treatment is from five to ten cents per square yard, depending on conditions. This figure includes cost of labor, machinery and material.

STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Avenue CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	S. DAKOTA	N. DAKOTA	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Huron	Fargo	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	MICHIGAN	Minot	Mankato	St. Joseph
Joliet	South Bend	Mason City	Detroit	WISCONSIN	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	Grand Rapids	La Crosse		
Quincy	Wichita		Saginaw	Milwaukee		

A City to Prosper Most, Industrially, Must Be a Good Place to Live in

Entire sections of an exhaustive industrial survey of Cincinnati were devoted to housing conditions, municipal government and finance (a topic of special interest), and public utilities. Parts of sections dealt with vital statistics, schools, water supply, fire prevention, park and recreation facilities and even such apparently remote factors as the Cincinnati Symphony Orchestra. All elements contributing to the "livableness," and hence to the industrial prosperity of the city.

THE CINCINNATI INDUSTRIAL SURVEY reflects the dominating importance of *public works* in making a city a good place to live. A government investigation of 248 cities further emphasizes the part *public works* play in a city's life. These 248 cities spent 45.9% of all payments in 1924 building new or maintaining old *public works*—streets, water works, electric light plants, schools, hospitals, sewage systems and similar works. An average of $4,887,293.77 a city!

Even a small fraction of these public works expenditures, saved by lower bids for contracts, would go far toward paying for *other* improvements that would make these cities even more "livable."

Advertising official proposals nationally in the Official Proposal Columns of Engineering News-Record makes possible worthwhile savings on most contracts. For, proposal advertising in Engineering News-Record creates keener competition. And keener competition cuts bids.

Nearly 400 cities last year sought savings from lower bids by advertising their public works contracts nationally in the Official Proposal Columns of Engineering News-Record. Thus, they paved the way for *more public works*. Hence better cities to live in—and, larger industrial growth.

If *you* do not know Engineering News-Record and its proposal advertising, write for a free sample copy and full particulars.

OFFICIAL PROPOSAL DEPARTMENT

ENGINEERING NEWS-RECORD

Tenth Avenue at 36th Street, New York, New York

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Annual subscription rate to any part of the world, $4.00. Back numbers available.

HAROLD S. BUTTENHEIM
Editor

THEODORE R. KENDALL
Secretary and Engineering Editor

M. V. FULLER
Associate Editor

EDGAR J. BUTTENHEIM
President and Manager

HERBERT K. SAXE
Treasurer

L. P. ANDERSON
Advertising Manager

The American City Magazine

Published monthly by
The Civic Press
443 Fourth Avenue
New York

Chicago Office
Tribune Tower
TOM DIX
Vice-President

Vol. XXXV

INDEX TO CONTENTS, DECEMBER, 1926

No. 6

Building Codes—Drafting and Enforcing.... 827
Building Lines Established, Winchester, Mass. 835
Buildings, Public
Community Welfare Building Proposed for New York 813
Art Museum a Gift to Atlanta 834
Cartoons 840
City and Regional Planning and Zoning
Constitutionality of Zoning Sustained by U. S. Supreme Court 771
Interdependence of Zoning and Park Planning 814
Regional Planning in Milwaukee County... 831
Highway Planning to Relieve Congestion.. 839
Rational Distribution of Population..... 844
Economy of Wide Lots 871
The Region—New Governmental Unit 879
Zoning Notes 881
City Manager Portraits 855
Conventions—When and Where.....862, 897
Edison on City of the Future..... 830
Elections
Voting Machines in Iowa 802
P. R. and City Manager Plan Approved.... 854
Large Bond Issues Voted Last Month.... 854
Engineering Department, West Palm Beach, Fla. 785
Finance
Statistics of Cities for 1925..... 856
Information Needed Regarding Revenues.. 860
The Municipal Bond Market 887
Fire Prevention and Control
Arson—A Moral and Legal Problem..... 796
Improved Facilities in Wichita Falls..... 833
Forward Steps 831
Grade Crossing Death Roll Grows 858
Health
Medical Society Decries Smoke Menace.. 791
Highways
Highway Construction to Prevent Accidents 824
Road Construction and Maintenance, Walla Walla 846
Motion Pictures of Asphalt Paving 903
Housing
Cooperative Home Ownership 798
Legal Decisions 875
Lighting
Largest Highway Lighting Installation... 787
Better Lighting on State Street, Chicago.. 807
Markets, Municipal 841
Military Training, Compulsory 847
News and Illustrations 899
Police Department, Chicago, Motor Vehicles in 800
Power-Plant in City of 4,000 823
Publications 889
Public Improvements and Real Estate Values. 857
Public Utilities 883
Recreation
Acquiring Land for Recreation Purposes.. 777
"Ask the Recreation Department" 813
Leisure as a Cause or Cure of Crime..... 863
Schools
Larger School Sites 845
New School in Baltimore 869
Sewage Disposal
Sewage Treatment Plant, New Rochelle.... 808
Septic Tanks in Individual Installations.. 822
How Can the Decent City Do This?..... 840
Street Cleaning and Snow Removal
Parades and Street-Cleaning Problem 792
Methods and Costs—II 804
Combination Tractor and Snow-Plow 899
Ice Breaker for City Streets 901
Snow-Plows for Patrol Systems 903
Street Fixture Prize Competition, Biscayne Boulevard, Miami 835
Traffic and Transportation
Making a Community Traffic Survey..... 772
Evolution of Traffic Signal Roundels..... 779
Bus Service by Electric Railways 803
Oakland-Alameda Estuary Tube 815
Traffic Count Helps Boston Planning..... 849
Progress Toward Uniform Traffic Code.... 851
Compulsory Insurance and Financial Responsibility Laws 873
Trees
Telephone Company Trims Trees Well.... 799
Roadside Planting by Community Effort.... 803
Waste Collection in South American City.... 859
Water-Supply and Water-Works
Boonville Buries Old Man Water Shortage.. 780
Chlorination 788
Meter Reading and Billing of Accounts.... 793
Conduit Sterilized 807
Origin and Growth of Public Water Supply—I 809
Protection of Reservoirs 826
Typhoid Patient Wins Suit Against City... 848
City's Liability for Purity of Supply..... 875
Protecting Pipe Lines 901

See also Municipal and Civic Publications, page 889

The offices of THE AMERICAN CITY, 443 Fourth Avenue, N. Y., are headquarters for the free distribution of information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.

Concrete Roads Need a Steel Reinforcement

Testing laboratories, records of highway departments and practical experience of road builders all point one way—steel reinforced concrete roads last longer and cost less to maintain. Steel reinforcement costs less and is more effective than additional thickness of concrete. Build your roads to endure by using Truscon Welded Steel Fabric, Truscon Rib Bars, Contraction Joints and Curb Bars for safety and protection. Truscon Road Forms will speed construction.

See our exhibit, Booths SB-6 and SB-7, American Road Show, at the Coliseum, Chicago, January, 1927.

SEND NOW FOR YOUR COPY

New and enlarged edition of Truscon Handbook "Modern Road Construction." Send in your name now and receive free copy.

TRUSCON STEEL COMPANY,
YOUNGSTOWN, OHIO
Warehouses and Offices in all Principal Cities.

TRUSCON
HIGHWAY PRODUCTS

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Vol. XXXV
No. 6

The American City Magazine

DECEMBER
1926

443 Fourth Avenue
New York

50 Cents
$4 a Year

Constitutionality of Zoning Sustained by United States Supreme Court

THE long-awaited decision of the United States Supreme Court in the Euclid Village case, which was handed down November 22, is a final and notable victory for the constitutionality of comprehensive zoning.

The previous history of this case (Village of Euclid v. Ambler Realty Company) was outlined by the attorney for the village, James Metzenbaum, of Cleveland, Ohio, in the July, 1926, issue of this magazine. The case came before the Supreme Court on appeal from the U. S. District Court for the Northern District of Ohio, which had granted an injunction to the respondent against the enforcement of the zoning ordinance of the village of Euclid.

The full text of the decision of the highest court, reversing the decree of the lower court, is published in *The United States Daily* for November 23. The decision supports the zoning principle in its general scope and comprehensive features, as a logical development of the police power under modern conditions of urban life. Important excerpts follow:

"Regulations, the wisdom, necessity and validity of which, as applied to existing conditions, are so apparent that they are now uniformly sustained, a century ago, or even half a century ago, probably would have been rejected as arbitrary and oppressive. Such regulations are sustained, under the complex conditions of our day, for reasons analogous to those which justify traffic regulations, which, before the advent of automobiles and rapid-transit street railways, would have been condemned as fatally arbitrary and unreasonable.

* * *

"There is no serious difference of opinion in respect of the validity of laws and regulations fixing the height of buildings within reasonable limits, the character of materials and methods of construction, and the adjoining area which must be left open, in order to minimize the danger of fire or collapse, the evils of overcrowding, and the like, and excluding from residential sections offensive trades, industries and structures likely to create nuisances. . . . Here, however, the exclusion is in general terms of all industrial establishments, and it may thereby happen that not only offensive or dangerous industries will be excluded, but those which are neither offensive nor dangerous will share the same fate.

* * *

"We find no difficulty in sustaining restrictions of the kind thus far reviewed. The serious question in the case arises over the provisions of the ordinance excluding from residential districts apartment houses, business houses, retail stores and shops, and other like establishments.

* * *

"The matter of zoning has received much attention at the hands of commissions and experts, and the results of their investigations have been set forth in comprehensive reports. These reports, which bear every evidence of painstaking consideration, concur in the view that the segregation of residential, business and industrial buildings will make it easier to provide fire apparatus suitable for the character and intensity of the development in each section; that it will increase the safety and security of home life; greatly tend to prevent street accidents, especially to children, by reducing the traffic and resulting confusion in residential sections; decrease noise and other conditions which produce or intensify nervous disorders; preserve a more favorable environment in which to rear children, etc.

"With particular reference to apartment houses, it is pointed out that the development of detached-house sections is greatly retarded by the coming of apartment houses, which has sometimes resulted in destroying the entire section for private-house purposes; that in such sections very often the apartment house is a mere parasite constructed in order to take advantage of the open spaces and attractive surroundings created by the residential character of the district.

"Moreover, the coming of one apartment house is followed by others, interfering by their height and bulk with the free circulation of air and monopolizing the rays of the sun which otherwise would fall upon the smaller homes, and bring-

ing, as their necessary accomplishments, the disturbing noises incident to increased traffic and business, and the occupation, by means of moving and parked automobiles, of larger portions of the streets, thus detracting from their safety and depriving children of the privilege of quiet and open spaces for play, enjoyed by those in more favored localities—until, finally, the residential character of the neighborhood and its desirability as a place of detached residences are utterly destroyed.

"Under these circumstances, apartment houses, which in a different environment would be not only entirely unobjectionable but highly desirable, come very near to being nuisances.

* * *

"What would be the effect of a restraint imposed by one or more of the innumerable provisions of the ordinance, considered apart, upon the value or marketability of the lands is neither disclosed by the bill nor by the evidence, and we are afforded no basis, apart from mere speculation, upon which to rest a conclusion that it or they would have any appreciable effect upon those matters.

"Under these circumstances, therefore, it is enough for us to determine, as we do, that the ordinance in its general scope and dominant features, so far as its provisions are here involved, is a valid exercise of authority, leaving other provisions to be dealt with as cases arise directly involving them."

How to Make a Community Traffic Survey

By Miller McClintock

THE type of survey which I wish to discuss is one which is designed primarily for the purpose of collecting facts that will assist in rational plans for the reduction of accidents and congestion upon city streets, through a better use of existing facilities. It should not be confused with community studies that are made as a basis for city planning work, that is, as a foundation for the improvement of street traffic conditions through the provision of new and more adequate facilities.

It is apparent that the traffic and physical conditions of American cities vary so widely that it is impossible to lay down detailed survey plans which will be universally applicable. Each city, because of its local peculiarities, presents a special problem. In the preparation of discussion, therefore, an attempt has been made to select methods which would be suitable to communities that may be considered typical.

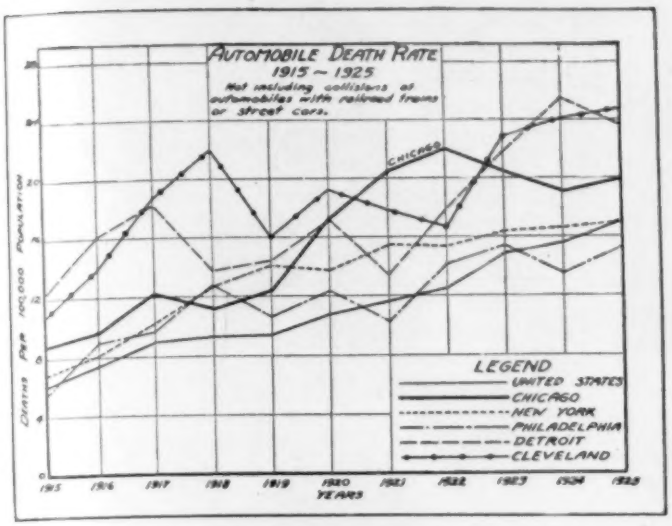
Further, a statement of the details of a survey in a sizable community would consume all of the available time with their mere listing. An attempt has been made, therefore, to give the general outlines of the survey and the principles which should govern it.

A question which naturally arises is: Why should a community feel it necessary to undertake a serious study of its traffic conditions? The answer is that while the weight of the street traffic problem in the form of accidents and congestion is generally recognized by public officials and business men of most cities, those in charge of the problem are too apt in casual observations to overlook the most obvious causes of the difficulties. Guesswork in street traffic control is no more fruitful of beneficial results than it is in any other engineering problem. And this brings me to the kernel of the situation. If the control of street traffic is to be dealt with as a purely political problem, as it too frequently is in American cities, then a serious attempt to collect facts is merely a waste of time and money. On the other hand, if the street traffic situation has reached a point where it can be considered as one demanding thoroughly rational action, it is time for the application of sound engineering technique. Such technique may be described as the process of collecting accurate data, and on the basis of these facts drawing warranted conclusions. There is no republican or democratic method for handling traffic, but there is usually a fairly simple solution for most traffic difficulties once their

Facts, Not Opinions,

are a safe guide for local efforts to reduce accidents and facilitate the movement of street traffic.

The author of the accompanying paper on "How to Make a Community Traffic Survey," is director of the Albert Russel Erskine Bureau for Street Traffic Research in Harvard University, and of the Metropolitan Street Traffic Survey of the Chicago Association of Commerce. The paper was presented before the Public Safety Division of the National Safety Council at its convention in Detroit, October 28, 1926. The charts are from Mr. McClintock's forthcoming Chicago report.



A COMPARISON OF AUTOMOBILE DEATH RATES

causes are understood.

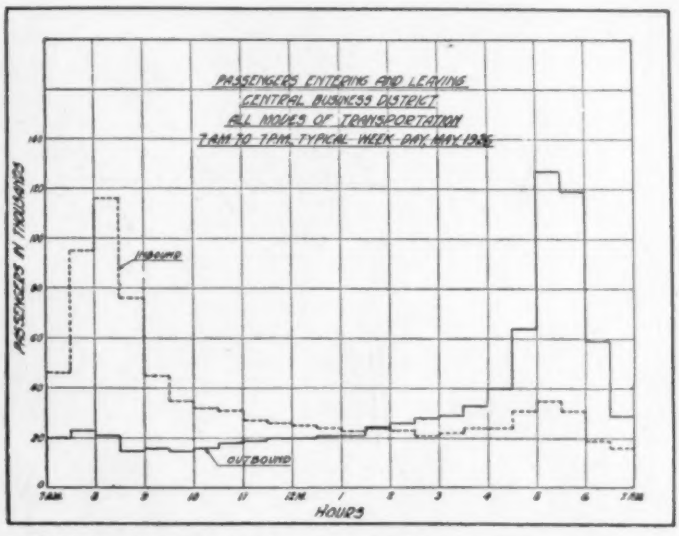
This entire discussion is based, therefore, on the assumption that the street traffic control problem is similar in its general characteristics to the other physical problems of municipal administration, such as water-supply, sewage disposal, street maintenance, and city planning, and that its solution or relief is to be found in a similar type of approach.

With this principle in mind, I want you to think of a traffic survey, not as a study that is to be made, printed, and filed away, but a study that is designed for the purpose of collecting information from which immediate results can be obtained. Moreover, it should be conceived as merely a first step in a rational method of dealing with the difficulties of street accidents and congestion. A single survey, no matter how skillfully designed, cannot be of perpetual value. It should serve merely as the basis for a continuing and intelligent study of traffic difficulties.

The principles and methods of traffic surveying are by no means new nor original except in their application. They have been used by public officials and public utilities for many years in dealing with the knotty problems presented by local transportation, telephone, gas, electric, water, and other fields of public service.

Organization for the Survey

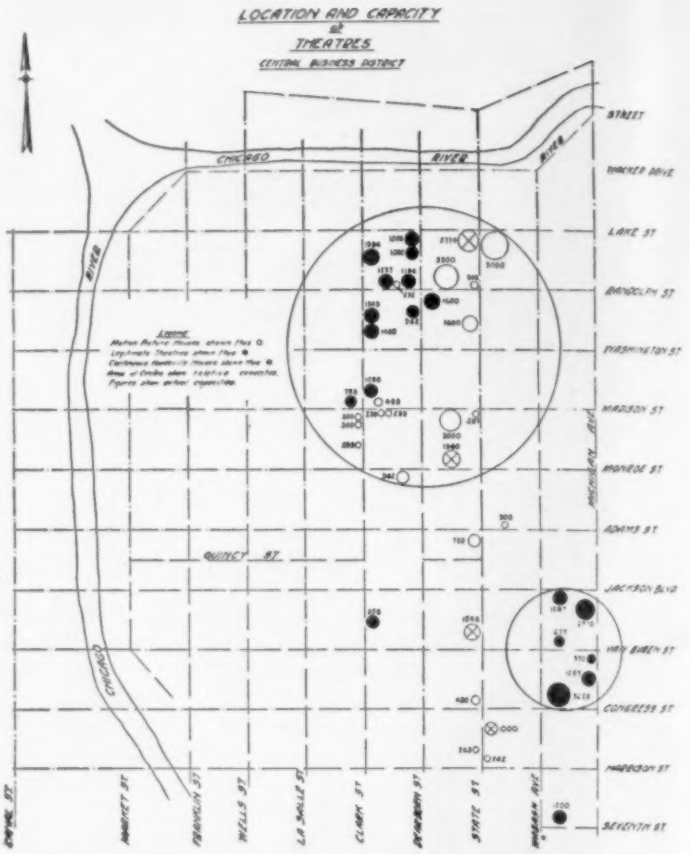
A successful survey requires both liberal public support and funds. These necessitate a suitable organization. The first problem, therefore, is to provide a body capable of sponsoring the work. Rather limited experience thus far appears to indicate that non-governmental groups are more apt to be successful in the initiation and support of such work. This is illustrated by the activities of the Los Angeles Traffic Commission, a group of prominent citizens with actual monetary interests in the traffic problem; in the conduct of the Metropolitan Street Traffic Survey by The Chicago Association of Commerce; and in the traffic survey of the city and county of San Francisco, under the direction of a committee of leading business men appointed by the Mayor. In all these instances the entire cost of the engineering work has been carried by private subscription. The non-governmental character of these groups has made possible a liberal financing, and a freedom from some of the limitations incidental to official operations. The conclusion is by no means drawn, however, that public officials



GRAPHIC PRESENTATION OF HOURLY FLUCTUATIONS OF TRAFFIC IN CHICAGO'S CENTRAL BUSINESS DISTRICT

could not successfully engage directly in such work.

One of the advantages which result from a private group is to be found in the opportunities which it presents to bring together the numerous and often antagonistic traffic interests. As your own experience will indicate, questions of traffic control are highly controversial. Matters relating to parking, the relation between motor vehicles and street cars, the operation of motor-busses, the position of the pedestrian, and many other similar problems, often create real and sometimes bitter differences of opinion. Opportunities for free discussion, under the restraining influence of the facts which are revealed in the survey, frequently show many of these differences to be more imagined than real, and to open the way for mutually acceptable adjustments.



White circles indicate motion picture houses; white circles with cross, continuous vaudeville houses; black circles, legitimate theaters. Areas of circles show relative capacities; figures, actual capacities

If the non-official plan is to be followed for the body sponsoring the survey, it is essential that care be used in its organization. It should be widely representative of all of the interests which feel that they have a stake in the use of the public streets. A list of those agencies which under no consideration should be left unrepresented might be as follows:

Street railways
Motor-car dealers
Automobile Club
Retail Merchants' Associations
Taxicab operators
Motor-coach operators
Insurance companies
Cartage companies
Building owners

The financing of the survey may properly come from this group, and a wider representation which may be added to it. More or less casual groups of business men who form organizations for the consideration of traffic problems are too prone to pass resolutions and let the matter lie at that point. On the other hand, when a business man goes into his pocket for four or five thousand dollars to support a project, he is going to demand something more than talk. It will be apparent from your experience that a local Safety Council may serve readily as the basis for a survey organization.

The sponsoring body which has been outlined above will serve as a jury, or perhaps more accurately as a board of directors, to pass upon the facts and conclusions resulting from the survey. The agreement of such a representative and responsible group upon proper recommendation naturally carries weight with public officials, and expedites the application of remedial measures that may be proposed.

The Technical Staff

Business men who may willingly give their time to such a committee as that outlined above, have neither the time, nor generally the inclination, to engage in actual survey work. The next step, therefore, is the organization of a technical staff. There are a number of courses that may be followed. In the recent

past a number of engineering firms, especially those operating in the adjacent fields of city planning or local transportation, have been manifesting an interest in the problem of traffic control. The services of a number of these firms are available for survey work. Cities can find already a limited number of young engineers who have special preparation in survey work. At the present time, Harvard University, the University of Michigan, the University of California, and several other institutions are giving professional training in traffic engineering.

At this point it may be well to clear a misapprehension that has arisen in some quarters. The Albert Russel Erskine Bureau for Street Traffic Research in Harvard University was not designed for the purpose of rendering professional traffic engineering service to American cities, but rather to assist in an approach to the problem through the collection and dissemination of sound information, and through the training of young men for professional activity in the field. Such surveys as have been conducted directly by the Bureau have been primarily for the purpose of developing a practical technique, and demonstrating the advantages of rational methods.

Conducting the Survey

The subjects to be covered by the survey will be determined by local problems to some extent. There are certain data, however, which are of general importance. For the purpose of conciseness the suggested subjects are listed below in outline form:

I. **The study of existing traffic use of the streets**
   - A. A census and analysis of traffic flow at important points throughout the city, including data on the following factors:
     1. Volume
     2. Direction
     3. Speed
     4. Types of vehicles
     5. Hourly variations
   - B. A study of the operation conditions and problems of various vehicle types:
     1. Street cars
     2. Commercial vehicles
     3. Private passenger cars
     4. Taxicabs
     5. Busses
   - C. A study of the concentration of traffic in the central business district through the making of a cordon count on a typical business day:
     1. Total number of vehicles entering the district
     2. Total number of persons entering the district

II. **An analysis of the parking problem; a study especially applicable to the central and outlying business districts:**
   - A. Capacity of the districts for parking
   - B. Current practice in parking
   - C. Amount of traffic obstruction offered by parking
   - D. Existing and potential off-street storage facilities

III. **Collection of accident statistics**
   - A. Collection and tabulation of existing data
   - B. This is not a study that can be completed satisfactorily in a short period. The collection of accurate information over a period of months, and even years, is requisite for confident generalization. The report forms and methods of the National Safety Council are recommended.

IV. **The relation between traffic and business**
   - A. A computation of trucking and other transportation costs attributable to traffic congestion
   - B. The effect of traffic upon accessibility of retail establishments
   - C. The relation between parking and retail trade

V. **A study of physical obstructions**
   - A. Street design
   - B. Pavement conditions
   - C. Private use of streets:
     1. Merchandising
     2. Signs, posts, boxes, etc.
     3. Building encroachments
     4. Storage of materials
   - D. Street openings

VI. **The effectiveness of existing regulations**
   - A. Through street—stop regulations
   - B. Left-turn rules
   - C. Operation of signal lights
   - D. Overtaking movements
   - E. Relation between street cars and vehicles
   - F. Pedestrian regulation

VII. **Study of police operation**
   - A. Enforcement methods
   - B. Directive methods
   - C. Adequacy of personnel:
     1. Numbers
     2. Training
     3. Equipment

VIII. **Functioning of the courts**
   - A. Volume of cases handled
   - B. Classification of cases
   - C. Disposition

Methods for the collection of data will depend somewhat upon the funds available, and the organization of the technical staff. Many of the investigations will be in the form of innovations, and these will of necessity require

direct and original action by the staff. Large counts of vehicles require the services of several scores of men for a considerable period in the larger cities, and this naturally involves large expenditures. Where funds are available, the best results will be obtained by a paid personnel, selected and trained for the work. Where conditions are favorable—and they are more likely to be in the smaller cities—volunteer workers can be used to advantage as checkers, with definite instructions and adequate supervision. In one city members of the Chamber of Commerce gave their time for this service. In another a very effective check was made through the services of the Boy Scout organization.

Fortunately, much of the information that is of basic importance to a comprehensive survey is already in existence in the average American city. The city departments should be able to provide information regarding the general physical characteristics and condition of the streets. Efficient city planning organizations usually possesses detailed data that are applicable to the problem of traffic control. The street railways, taxicab companies, motor-coach companies, and trucking concerns normally keep useful reports of their operating conditions. Their representation on the sponsoring body, and their understanding of the purpose of the survey, will facilitate the acquisition and use of this material. Earlier studies of traffic conditions, even though local and special in character, are serviceable where their accuracy is dependable for the drawing of comparisons. A full use of these and similar sources of information will greatly reduce the cost of a comprehensive survey, and will expedite its completion.

The physical scope of the survey will depend upon local conditions. Where funds permit, the investigations should extend out from the center of the community so far as traffic affects local conditions. Little or no attention should be paid to political boundaries, for traffic does not heed them. Intensive investigation within the city will naturally be directed to those localities where traffic has proved by observation to be burdensome, the principal arteries leading into and through the community, the more important outlying business districts, and the central business district.

Concluding the Survey

The materials of the survey, when collected and analyzed, should be set forth in a clear and concise report. Emphasis cannot be laid too strongly upon the necessity of presenting the data in such form that they can be readily understood. Several charts are incorporated in this report from the Metropolitan Street Traffic Survey recently conducted by The Chicago Association of Commerce, to indicate graphic methods for the display of actual results.

The drawing of conclusions from the materials collected presents, of course, the most difficult and delicate part of the survey work. Few suggestions can be offered as to procedure. With sound facts available, however, reasonable men, even without a large degree of technical training, are likely to come to similar conclusions.

Recommendations to be drawn from the survey material will naturally fall into two classes. First, those rules for the regulation of traffic, which have been indicated as necessary. These should be formulated into a simple traffic code. Secondly, there will be inevitably recommendations for administrative changes to make the future control of traffic more effective. Specific details of such proposals will vary according to local political conditions. In all cases, however, provision should be made for the placing of definite responsibility over traffic control in some public official or group of officials, and for the provision of suitable traffic engineering services for the future.

For The Municipal Index, Edition of 1927

the author of the foregoing paper will contribute, to the section on Traffic Control and Facilitation, a comprehensive review of the progress during the last two years in this important field of municipal and state administration. This study, which is being prepared especially for THE MUNICIPAL INDEX, will serve to bring up to date Dr. McClintock's authoritative book on "Street Traffic Control," published in 1925.

Other features in this section of THE MUNICIPAL INDEX will be a list of the Chiefs of Police of American cities of 10,000 population and over, together with the name and title of the official in charge of traffic regulation, if other than the chief of police; also a tabulation based on a questionnaire recently sent by THE AMERICAN CITY to the Chiefs of Police, covering their experience with the use of pavement markings for traffic control.

Various Ways of Acquiring Land for Recreation Purposes

A Summary by L. H. Weir

I. Purchase

1. Acquisition by direct negotiation between the governmental agency desiring the property and the owner of the property

This is the most common method of acquiring recreation areas by governmental agencies and is universally practiced throughout this country.

2. Acquisition through reserving designated areas on subdivision plat maps presented for filing and subsequent direct purchase of such areas

This is the common practice in Philadelphia, where a state law gives the city authorities the right to designate on all subdivision plats such areas as are deemed necessary for parks and playgrounds. The city must exercise the right to purchase these areas within three years. If the city does not do so within this time, the areas may be cut up and sold by the subdivider.

3. Acquisition through excess purchase

This is a method whereby more area is purchased than is needed for the desired recreation area, the surplus being sold with the intention of securing sufficient income from such sales to cover the entire cost of the tract, including the area reserved for recreation. This method is not commonly practiced either by private individuals or by public authorities in this country.

In Lorain, Ohio, a group of citizens purchased a large area of ground and after reserving one hundred acres for a public park sold the remainder for a sum sufficient to cover the entire cost of the original tract. The hundred-acre park was then deeded to the city.

In Fort Worth, Texas, there is one instance of the Park Commission's having purchased an excess area the sale of which covered the entire cost of the tract, leaving the recreation area entirely free of cost to the public funds.

4. Acquisition through condemnation and purchase

This is the usual method employed by public authorities when it is impossible to come to satisfactory terms through the method of direct purchase with the owner of the desired property. It is never resorted to except in the last extremity, because the court proceedings involved are likely to be long, tedious, and expensive, and the ultimate value decided upon higher than the governmental authority desires to pay.

5. Acquisition through excess condemnation and purchase

This is similar to the method described in paragraph 4, except that more area is taken than is desired for the park or other recreation area, the surplus being sold with a view to covering the cost of the original purchase price or partially covering it.

The laws of Ohio give municipal governments the right to exercise excess condemnation, but public sentiment (especially from certain interests) is so strong that the right has not been exercised.

6. District assessment plan

This is a plan largely used in Minneapolis in acquiring and developing neighborhood parks under the law known as the Elwell Law. The same law is used there also in acquiring and developing parkways and boulevards. Kansas City, Mo., and Indianapolis have also made wide use of the assessment plan.

7. Purchase through revenues from use of the properties

In Minneapolis two 18-hole golf courses are being paid for through this method and in Fort Worth, Texas, an 18-hole municipal golf course. In this latter city a large swimming center is also being paid for by the revenues from the use of the center.

The Playground and Recreation Association of America and the American Institute of Park Executives

are cooperating in the most complete study yet made of municipal and county park and recreation systems in the United States. Under the direction of L. H. Weir, two volumes are in preparation: "Park and Recreation Systems, Municipal and County—A Statistical Report," and a "Park and Recreation Manual."

The accompanying summary of various ways of acquiring land for recreation purposes, compiled by the author in connection with the above-mentioned studies, was presented by him at the Recreation Congress at Atlantic City, October 20, 1926. Readers of The American City desiring additional data regarding any of the methods outlined, can obtain such information by addressing Mr. Weir in care of the Playground and Recreation Association of America, 315 Fourth Avenue, New York.

II. Acquisition Through Gifts

1. Gift in fee simple

This is a method whereby a private individual or corporation deeds in fee simple a given area for recreation to some governmental authority. A far larger number of the existing recreation areas in this country than is usually supposed have thus been acquired. In such a deed there are no restrictions upon the use of the property.

2. Gift in trust

The gift in trust of a recreation area usually involves some specific terms with respect to the governing control of the property and limitations with respect to the use of the property. Thus, the deed of trust might set up a specific form of gov-

erning authority and provide that, whenever the area ceases to be used for the purpose for which it is given, it will revert to the original owner or the heirs. Such gifts should be very carefully considered before acceptance by any governmental authority.

3. Gift under easement

This is a gift not to a public authority, but to a number of individuals living in a given locality, by a private individual or a corporation. For example, a subdivider desires to set aside a given area for the recreation of the prospective inhabitants of the subdivision. For some reason or reasons, it may not be desirable to deed this area outright to the local municipal government. The subdivider includes in the terms of sale to each purchaser of a lot or lots a perpetual easement right in the area set aside for recreation.

Gramercy Park in New York City is an example of such a recreation area. In modern subdivisions, recreation areas held under easement by the inhabitants of the subdivisions are now quite common.

In the Sunnyside development in the Borough of Queens, New York City, the interior courts of the residential blocks are set aside for recreation use, and easement is included in the deed to the purchaser of property in the block.

4. Gift by dedication

A subdivider in laying out a subdivision may set aside certain areas and dedicate the same for recreation purposes in perpetuity. Sometimes it may be years before such areas will pass under control of the local municipal government, but as a general rule, if the given areas are desirable for recreation purposes they pass quite readily under the control of the municipal authorities.

In the Sunnyside development, mentioned above, a play field has been set aside by the developers and dedicated for recreation use. It has recently been placed in charge of the New York Community Trust, with large discretional powers. The plan is to organize a local citizens committee to have charge of the use of the field.

III. Acquisition Through Transference

This is a method of acquiring recreation areas through the transfer of property from one governmental agency to another governmental agency. As a general rule, properties thus transferred were originally purchased by the public for some public function other than recreation and in the course of time became no longer necessary for the original purpose. Examples of such transfers of property follow:

1. Federal Government (Department of Agriculture, Navy Department, War Department, Treasury Department, etc.) to state governments

Within recent years there have been many such transfers of Federal Government properties no longer needed for their original purposes to state governments for recreation purposes. In most cases there was a purchase transaction involved, but often the purchase price is only nominal.

2. Federal Government to county governments

In a few instances county park and recreation systems have been wonderfully enriched by transfer of Federal properties to the counties. A striking instance of this was the transfer of about 5,000 acres from a Federal Forest preserve to Los Angeles County, Calif., for use as a county park.

3. Federal Government to municipal governments

There are numerous examples of such transfers, such as old naval stations, forts, military preserves, sections of forest preserves, etc. A striking example of a transfer of a section of a Federal forest preserve to a municipality for a great outlying park is that of Phoenix, Ariz., whereby this city secured a tract of several thousands of acres to be used as a great forest-mountain park.

There are specific Federal laws governing the transfer of surplus military and naval areas to states, counties, and municipalities. In practically every instance the Federal Government retains an easement right in such properties, so that in case they cease to be used for recreational purposes by the state, county, or municipality, they revert to the Federal Government.

4. Transfer by state government to county

An outstanding example of such a transfer is that of the area now known as Mohansic Park (1,100 acres) to the Westchester County Park Commission by the state of New York. This was originally purchased by the state as the site for a state institution, but it was later found undesirable to use for this purpose. If it ceases to be used for park purposes, it reverts to the state.

5. Transfer by the state to a municipality

Recently, as a result of special legislation, New York State has been authorized to turn over to municipalities and to counties, for recreation use, parcels of state land that have come into the ownership of the state as the result of non-payment of taxes, etc. This transfer is made at the nominal price of one dollar per parcel. Such parcels of land that are not suited for recreation use may be sold by the state and the proceeds used for the purchase of land for recreation use or for other purposes.

6. Transfer by municipal government to state agency

On Long Island the city of New York owned large tracts of land formerly used as watershed and as sites for huge reservoirs. A large part of this area in course of time became no longer desirable for its original use. During 1926 several thousand acres of this property were transferred by the city of New York to the Long Island State Park Commission to be used as a state park.

7. Transfer by municipal government to county government

In those counties of the nation having county park systems there are several examples of the transference of municipally owned property to the county to be used as county parks. This is especially true of municipally owned park properties, the transfer of jurisdiction being made in the belief that such properties can be better administered by the larger agency. Such a transfer, of course, does not represent an original acquisition. However, old water properties, water-front properties, etc., may be thus transferred, a transfer representing a definite addition to recreation area.

8. Transfer by county government to municipal government

The county government of the county in which Savannah, Ga., is situated transferred to the municipality a tract of 640 acres on the condition that the city would develop and operate the property as a large outlying park. This property was originally the county poor-farm. There are many such properties owned by counties throughout the nation that may just as well be turned into county or municipal parks, for it has been found that as a general rule it is neither profitable nor necessary to operate large farms in the care of the poor of the counties.

9. **Transfer of property under the control of one department of a municipal government to the control of another department of the government**

In Dallas, Texas, such a transfer of old water properties from the Water Department to the Park Commission added over 3,100 acres to the park system and gave the people two wonderfully fine outlying forest-water parks. In Fort Worth, Texas, the Water Department transferred to the Park Commission nearly 3,000 acres of a 9,000-acre water property reservation, for use as a large outlying forest-water park.

Old municipally owned cemetery sites have thus been transferred for park purposes; likewise, old sewage disposal plant sites, etc. In those few cities throughout the country fortunate enough to have extensive commons, transfer of portions of the common land from the commons commissioners to the park authorities have added greatly to the recreation areas of such cities.

Delinquent tax properties are constantly falling into the control of municipalities and counties. These properties become a potential reservoir of playground and park areas.

IV. Recreation as a By-Product

Areas acquired for another public purpose are frequently available for recreation use, while still being retained for the purpose for which they were originally acquired. The most outstanding examples of such joint use follow:

1. **Federal forest preserves**

It is now, and has been for several years past, an established policy of the Federal Bureau of Forestry to throw open the forest preserve areas for the recreational use of the people of the nation. The ways in which these vast areas are used by the people for recreation are many and include tourist camping, organized camping, family camping in permanent locations, hunting, fishing, hiking, horseback riding, etc.

2. **State forest preserves**

Practically the same policy has been adopted by state forest authorities respecting the recreational use of state forests as has been adopted by the Federal forest authorities.

3. **Town forests**

Here the same policy prevails. Except in Massachusetts, there has been no active development of town forests throughout the nation.

4. **Water department properties**

Many municipal water departments throughout the country have opened their properties to the recreational use of the citizens and their families. In a few instances the water departments have actually constructed recreation facilities such as picnic places, swimming pools, baseball diamonds, tennis courts, etc.

5. **Sanitary district properties**

The Sanitary District Commission of Chicago owns large tracts of land, some of which is being used for recreational purposes. In this particular instance there is no good reason why the major portion of the surplus land under the control of this commission could not be used for recreational purposes.

6. **Water-front properties—piers**

The Dock Department of New York City has built a roofed-over second story on several of its commercial piers for the purpose of using the second story as a playground for children and an evening recreation center for adults. The use of these recreational piers has been placed in the hands of the Park Department. The Dock Department, however, retains ownership and provides for repairs and general upkeep. A large municipal pier in Chicago is similarly used for recreation purposes.

7. **School site properties**

School sites are now largely used throughout the United States for community recreation purposes. Because of the growing appreciation by educational authorities of the value of play as an educational process, resulting in a policy of securing larger and larger grounds for school sites, these sites are becoming a factor of first importance in providing childrens' playgrounds, neighborhood play fields, and athletic fields, in city planning for recreation.

Evolution of Traffic Signal Roundels

THE roundels, or lenses, as they are sometimes improperly called, are a very interesting part of traffic signal design. The three colors used are more or less standard, that is, the railroad signal standard of red, and green, and the high efficiency yellow, but the type of these roundels varies considerably, depending upon the service that is required.

The first roundels furnished with signals were clear, the same as those used for railway service. These, however, gave an intensive beam of light covering but a very small angle, and hence with a driver close to the signal and on one side, the signal was hard to see. The next type brought out was what is known as a diffusing roundel, which is still very popular today. With this type of roundel the intensive beam is broken up and thrown out in every direction. While this is an improvement on the clear roundel, it is wasteful, since the light rays should be thrown out as a fan shape to the right or to the left only of the signal, and none thrown upwards.

This latter result has been obtained in a new piece of glassware known as a refracting plate or refracting roundel. These plates are covered with small, straight grooves which throw the light to one side or the other, depending upon how they are set in the signals, throwing the light out as a band of light rather than a glow and in so doing giving a more intensive beam over the part of the street where such beam is required, and eliminating it from the part of the street or above the street where the beam is not required. There are several makes of this type of refracting plate on the market, and they are coming more and more into use as they become better known.

The one point that must always be borne in mind is that there is only a certain amount of actual light in a lamp and that the function of a design is to get as large an amount of this light as possible to the eye of the driver of an approaching vehicle in order that he may see the signal and obey it. To do this we have only two things to depend upon—first, the reflector, and, secondly, the colored roundel in front of the reflector. In these two pieces of glassware the real efficiency of any signal is worked out.

—From a paper on "Traffic Signal Installation," by L. W. McOmber, Engineer, Essco Manufacturing Company, at the convention of the International Association of Municipal Electricians, Asheville, N. C., September, 1926.

Old Man Water Shortage Buried in Boonville, Ind.

By Charles Brossman

Consulting Engineer, Indianapolis, Ind.

THE water-works for Boonville, Ind., were built in 1896 by the Boonville Water Works Company and leased to the town, the town taking $10,000 worth of stock. The population at that time was 1,900. The plant was put into operation in August, 1896, under a franchise for a term of twenty years providing for the future purchase of the works by the city. The original pump was a McGowan duplex steam pump with a capacity of 1,000,000 gallons per day, supplying about five miles of pipe line to which the consumers and 35 fire-hydrants were connected. The original cost of the plant was $31,000, and the source of the supply was an artificial reservoir from which water was pumped to a 100,000-gallon tank.

Since 1896 the population has increased to approximately 5,000, with a water consumption of from 250,000 to 300,000 gallons per day, or about 60 gallons per capita. The present water-supply is taken from two lakes, the first of which is about 2,300 feet from the pumping-station, with a capacity of 34,000,000 gallons. The second is about 7,500 feet from the pumping-station and has a capacity of 40,000,000 gallons. There are about 2,300 feet of 10-inch pipe fom Lake No. 1 to the pumping station, and about 4,000 feet of 8-inch pipe between Lake No. 1 and Lake No. 2.

THE FORMAL AND CHEERFUL BURIAL OF OLD MAN WATER SHORTAGE

The standpipe has a capacity of 100,000 gallons, is 85 feet high to the balcony, 112 feet to the top, and 30 feet in diameter by 27 feet, with a hemispherical bottom having a 5-foot drop, making the total height of the tank 32 feet.

The old pumping equipment consisted of one duplex steam-driven pump and one Dayton-Dowd electric-driven centrifugal pump, the latter located in the electric light plant. It was estimated that 90,000,000 gallons of water was pumped per year, or approximately 250,000 gallons a day, but in considering improvements a figure of 300,000 gallons per day was used.

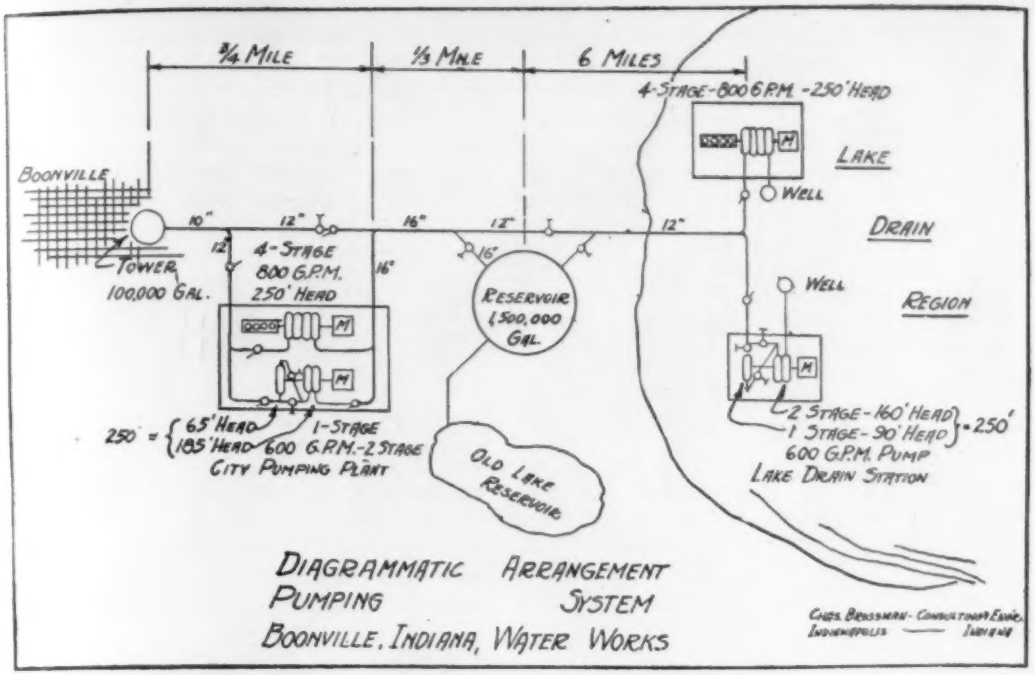
At the present time there are 3,625 feet of 10-inch mains, 1,505 feet of 8-inch, 28,948 feet of 6-inch, 18,824 feet of 4-inch, 1,382 feet of 2-inch, 1,610 feet of 1½-inch, and 3,000 feet of 1-inch, totaling 58,892 feet. There are 1,063 ¾-inch services, three fountains and troughs, and 74 4-inch fire-hydrants. The pressure at the pumping-station is approximately 83 pounds.

From the data above, it will be seen that since the original plant was constructed there has been considerable growth and that the mains and hydrants have more than doubled. An investigation of the water-works reservoirs and drainage area shows that both are insufficient. The drainage area especially is very small and has been the cause of scarcity of water from time to time and especially in times of extreme drought, which occur at periods of about thirty years, as shown by a study of rainfall conditions.

The present supply is surface water, and the only treatment it receives is chlorination, which, with the character of the water available, does not make a proper and safe drinking water. In addition to being surface water, Pond No. 2 receives considerable mine drainage, making the water practically unfit for use.

Population

It is necessary to make an approximate forecast of population to determine the future consumption of water. The population of Boonville in 1896 was 1,900, in 1900, 4,450, in



January, 1925, about 5,000, and, based on the above, a curve was plotted which shows an approximate population of probably 9,000 in 1950.

The present water consumption is about 300,000 gallons per day, or about 60 gallons per capita. This is expected to increase somewhat when the new water is turned in, because of its better quality. In 1940 it is expected that the consumption will be 720,000 gallons per day; in 1950, 900,000 gallons per day. It is expected that by 1940 the consumption will increase from the present figure of 60 gallons per capita to 90 gallons or more.

Sources of Supply Investigated

A number of available supplies were investigated, the first being the Squaw Creek site about 7 miles northwest of Boonville. This contemplated the construction of a 20-foot dam. The average area on this dam was approximately 10 square miles. In this same location a dam 15 feet high was also considered. The cost for this location, including pipe lines and with a 20-foot dam with all necessary work, was $397,000, which also included a filtration plant. The cost for a 15-foot dam with the other work was $363,000.

The third scheme was at Cypress Creek, 4½ miles south of Boonville, the estimated cost of which would be $327,000, including a filtration plant. This location, however, had only 1¾ miles of drainage area. The location for the dam was good, but for lack of sufficient supply it could not be seriously considered.

A location on Little Pigeon Creek at a point about 6 miles southeast of town was considered. Little Pigeon Creek at this point has a drainage area of 15 square miles, but this would have meant an estimated cost of $242,000, not including the construction of the dam, which probably would have been necessary, as the dry-weather flow in the creek would not have been sufficient without storage.

Of course, the Ohio River was also considered, as it would furnish an unlimited supply of water, although the nearest available point was about 10 miles south of Boonville. Investigations showed that the total cost of this project would be approximately $520,000 and the pumping charge would be very high because of the lift and friction in the long line. All these locations would have required filtration plants, which would have increased the total cost as well as the pumping cost.

The omission of a filtration plant with its attendant cost of operation is of considerable importance in a community the size of Boonville, so subterranean supplies were considered. Five or six holes were drilled in the vicinity of Boonville, resulting in wells suitable only for farm purposes or dry holes.

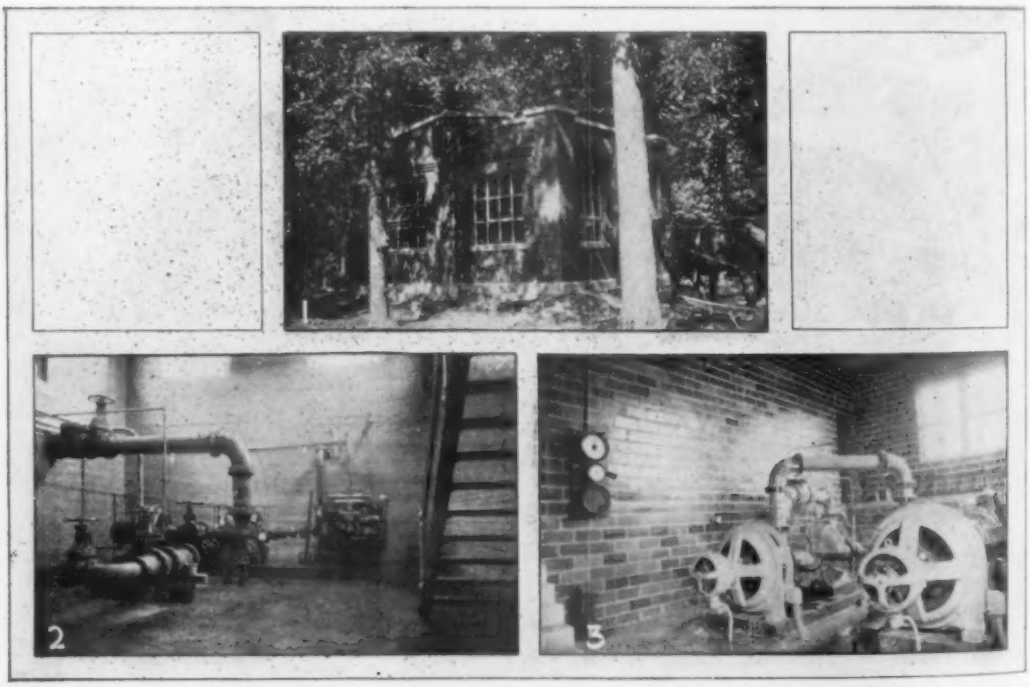
Other well supplies were considered southeast of Boonville in what is known as the Lake Drain region. These sources were thoroughly investigated, starting with surface investigations, and later actual drilling. The Lake Drain region was found to give every indication of an

unlimited supply for Boonville at an estimated cost of $290,000 for one scheme and $217,475 for an alternate scheme. The first scheme contemplated pumping direct from the wells to the water-tower at Boonville, and the second scheme contemplated one pump at the well site pumping to the reservoir at Boonville and then a second pumping to the elevated tank. This latter system was finally adopted as the most flexible. The actual cost, exclusive of land, was $216,283.

The city drilled a number of test wells in the Lake Drain region, the first in the neighborhood of Bullecktown, and later further into the Lake Drain region where the present wells are located. All of these showed gravel from the start, gradually increasing in depth as the Lake Drain region was penetrated. The present wells are located at a point where the waterbearing gravel is approximately 25 to 28 feet deep, stopping at sandstone about 50 feet below ground. After the test wells were drilled, a contract was let for two 16-inch wells, both of which were approximately 50 feet deep, having 18 feet of Cook strainer 15 inches in diameter. The strainers were not slotted until after drilling, and then were slotted to suit the kind of gravel found. In the case of the coarse gravel the slots were made large enough to take out all fine sand, but where the deposit showed fine sand only a fine screen was used.

Because of the simplicity it was thought desirable to use centrifugal pumps, if possible. In running the test on the first well it was found that the standing head of water was approximately 12 feet below the ground, but when pumping around 300 gallons per minute the water drew down approximately 26 feet below the surface. The pumps will be placed in a pit about 10 feet below ground, which will give an approximate lift of 15 feet at 300 gallons, or around 20 feet at 800 gallons. Actual pumping at around 700 gallons a minute showed a vacuum of 25 inches at the pump. Therefore, each 16-inch well was reinforced with a 10-inch well placed about 300 feet away, and with a 6-inch suction line running from the well to the main pump section. The actual test at 800 gallons with two wells showed a vacuum of 16 inches on the gage, so that with two wells to each unit ample capacity was developed for the pumps.

It was decided to use two pumping-stations in this region. Each pump has a 16-inch well with an auxiliary 10-inch well. The main pump is a 4-stage, 250-foot head, 800-gallon-per-minute pump with a 75-horsepower motor at one end and a 90-horsepower Sterling gasoline engine at the opposite end. The other pump is a 600-gallon-per-minute unit and consists of a 2-stage pump at 160-foot head, and on the same shaft with a jaw clutch an additional



STRATEGIC PARTS OF THE NEW BOONVILLE, IND., WATER-WORKS
Top.—Pump-house at Lake. Bottom.—Left, Number One pump-station; right, city pump-station

single-stage pump at 90-foot head. The two pumps can be placed in series, giving 600 gallons a minute at 250 feet, or, by throwing out the end pumps, 600 gallons a minute at 160 feet.

The same scheme is followed in the pump-house located in the city of Boonville, at which point there is an 800-gallon pump with a gasoline engine and motor good for a 250-foot head, as well as a motor-driven pump, one pump being two-stage for a 185-foot head, and the second pump on the same shaft being a single-stage pump good for a 65-foot head, giving a total of 250 feet of head when the unit is placed in series. This arrangement is somewhat unusual, but it has been found very flexible and economical.

Quantity of Water

In any water-works system there are two factors to consider as far as quantity of water is concerned—one, domestic consumption; the other, fire consumption. It is often hard to reconcile the two, and centrifugal pumps with long pipe lines sometimes present very complex problems if real economy is to be obtained. Hence the reason for this combination at Boonville.

With the new 1,500,000-gallon reservoir and 100,000-gallon standpipe, the Fire Inspection Bureau desired a capacity of not less than 1,400 gallons per minute for fire pumping, taking into consideration the storage capacity and reservoir. It will, of course, be a long time before Boonville will require 1,400 gallons per minute for domestic consumption. This would mean only three hours' pumping for the present supply, but it would require a very heavy electric demand and a large-size motor.

Since 1,400 gallons is the minimum, the pumps were designed to take care of the necessary static and friction heads when pumping at this rate. If one pump were operated, designed for this total friction, because of the characteristics of centrifugal pumps there would be a large drop in friction head and a corresponding loss in economy due to the changed conditions. It was found that a 600-gallon-per-minute pump of two stages could be very easily used and was good economy for ordinary pumping, by using the two-stage pump at the reservoir, or if a fire demand arose and both pumps were thrown in, a 600-gallon-per-minute pump could be placed in series and would be good for a total head of 250 feet. This would be operated in this manner with the 800-gallon-per-minute pump. When these two pumps were in operation, the total head would be in the neighborhood of 250 feet. In domestic pumping, however, using the 600-gallon-per-minute pump, because of the difference in friction the head would be only about 160 feet, with the one pump.

In addition to this, the combination 600-gallon-per-minute pump at the Lake Drain can be placed in series for a 250-foot head and by-passed around the reservoir, thereby pumping direct from the Lake Drain region into the elevated water-tank. Likewise, at the city pumping-station, for ordinary consumption, 600 gallons per minute with single- and double-stage pumps can be used and in case of fire can be placed in series. The 600-gallon-per-minute pump will run in connection with the 800-gallon-per-minute pump, the two giving 1,400 gallons per minute at 250-foot head. This gives a flexible arrangement and also allows good economy when pumping the domestic supply, at the same time giving a system meeting either the fire requirements or increased consumption due to growth. Space is left in each pump-house for future pumps.

Each well is equipped with a Cook foot-valve placed below the water-line of the well, and while there is a check-valve in the discharge line of the pump, there is also a by-pass around the check, so a smaller line would always feed around the check and keep the pump primed in case of slight leakage through the foot-valve.

These pumping units are operated with General Electric synchronous motors with direct-connected exciters. The pumps are designed to give approximately full load on the motors, and when operating at the designed pressure they are practically at full load. The motors are 2,300-volt, 3-phase, 60-cycle units using primary current, which, with the synchronous motors, give the lowest possible electric rate.

It is the intention that the Lake Drain stations will be operated by a farmer living across the road from the pumping site, as the operation is comparatively simple. One pump in each case is equipped with a Sterling gasoline motor to provide against an interruption of power service. In the city, the pumping-station is similarly equipped, using a 2,300-volt synchronous motor with gasoline engine reserve. The old water-works was located in the electric light company's plant in order to save the cost of the attendant. To carry out this same idea, a new fire-station was built which houses the fire-trucks for the fire department. This station also has a five-room dwelling upstairs for the attendants, and in the rear are located

the pumping-plant and workshop. No extra attendant will be required for this operation.

Financing

The financing of this work is of interest. Almost a year elapsed after the report and recommendations were made on this work, and the wells were actually drilled, when it was found that the water in the old reservoirs was getting low. Hon. Thomas Mullins, Mayor, realized the importance of pushing the work and a movement was started at once to raise sufficient money to build the new pipe line. Bids were taken on pipe, and U. S. Cast Iron Pipe Co.'s centrifugal cast pipe was selected. It was realized that something would have to be done to get the work started. A meeting was called by the Mayor to which representatives of the three Boonville banks were invited, and the situation was put squarely before them to raise enough money to let the contract for the pipe laying. The money was subscribed within a few hours, each bank promising to take its portion. Contracts were let for pipe and laying, and with a water shortage staring the city in the face, E. H. Hartig, of Evansville, Ind., took the contract to lay 5½ miles of pipe in 40 days. Work was started at once and contracts were let for the first pump-house and one pump.

As the lakes at Boonville became lower, the pipe line crept closer to Boonville, and, anticipating the day when the pipe line would be finished, the town set July 28 as the day for opening the valves and putting water into the old lake. The water in the lake was being used so fast that a temporary pipe line was laid from a pond at one of the mines some distance away, 6-inch pipe being hauled in from Owensboro, Ky., where the old private plant was being dismantled. This pipe was laid on the ground and a small gasoline unit placed at the pond. Water pumped over the hill flowed into a ditch which finally reached the old Boonville reservoir. Even this did not help very much, and by the day the pipe line was completed to the old reservoir, the water in the reservoir had practically reached the bottom, although use of the supply had been restricted.

The End of Old Man Water Shortage

On the day set for inaugurating the new water-works a large part of the population of Boonville was on hand to see the opening of the valve. The ceremonies were started when a large black hearse bedecked with plumes and hauled by a team of black horses carried a large coffin in which was the body of "Old Man Water Shortage." In a little mound near the old lake, with six willing pallbearers who were far from being mourners, the body of Old Man Water Shortage was lowered slowly and reverently into the grave. This gave the only tinge of sadness to the celebration, unless it was the pitifully small supply of water in the old reservoir before the new supply was turned on.

INTERIOR OF THE 1½-MILLION-GALLON RESERVOIR AT BOONVILLE, IND.

The new pump had been in operation for several hours and as soon as the services were over the crowd repaired to the scene of the opening of the valve, which was turned on by the Mayor. With the pumps under high pressure, a large amount of air in the new pipe line burst forth with the water, and spectators were drenched with the new water-supply.

It is now believed that the water troubles of Boonville are over for all time, as there is at least 30 to 40 square miles of water-bearing strata in the Lake Drain region, and should the city continue to grow, the supply line can be extended and new pumping-stations added as the consumption increases. A simple calculation will show, however, that the area around the present pumping-station will suffice for a long time, as the supply in the region is fully adequate to meet the demand.

Boonville's water-supply is an example of what can be accomplished when necessity arises. The usual procedure in such towns and cities is to keep putting off, but when the city found it had to do something or have no water, the money was raised within a few hours under two separate subscriptions. After the plant was built and something tangible was at hand, the matter of selling the bonds for the project was not difficult.

What Boonville has gone through shows the futility and error of tying into inadequate sup-

plies. For little more than it cost to build the first two reservoirs in Boonville, a pipe line could have been built at the Lake Drain region thirty years ago.

The New Reservoir

The new reservoir is of concrete, circular, with mushroom type columns at top and bottom. It is 125 feet in diameter and 18 feet deep, with floors 12 inches thick, and roof 6½ inches thick, both reinforced in three directions. The walls are 16 inches thick, with a double row of reinforcing. The reinforcing bars were held in position on steel chairs or supports which were welded to 4-inch channels. These chairs held the steel in proper position while the concrete was being placed. The floor was built first, then the walls, then the columns and the roof.

A joint ½-inch x 6 inches deep was left throughout the entire junction of wall and floor. This was later poured with asphalt and calked with oakum in alternate layers. In addition to this, to provide against leakage an 8-inch galvanized crimped iron strip was placed half in the floor and half in the wall, to provide against any possibility of leakage. On top of the roof was placed a reinforced concrete aerator house having cast iron baffles set on an incline of about 30 degrees. The water from the Lake Drain is discharged over this and thoroughly aerated before falling into the reservoir. The reservoir is also arranged to by-pass the water direct to the city pumping-station. The reservoir was built by the Roth Construction Company, of Boonville, Ind.

The strainers used in the wells were made by A. D. Cook, Lawrenceville, Ind. They are 15 inches in diameter and approximately 18 feet long and are slotted to suit the gravel. The pumping units are Dean Hill 4-stage pumps for the 800-gallon unit, with G. E. 75-horsepower, 2,300-volt motors, and 4-cylinder, 90-horsepower Sterling engines for the alternate drive. The 600-gallon pumps are the same make, except two stages that are separate from the last stage. This last stage could be cut in by a jaw clutch. The pump is driven by a 60-horsepower G. E. synchronous motor. The centrifugal cast pipe with lead joints was furnished by the American Cast Iron Pipe Company. The pipe line was laid by Emil Hartig, Evansville, Ind., in less than 40 days. The entire work was designed in the office of Charles Brossman. George T. Gilbert was resident engineer on the construction work, C. C. Abbott, City Engineer of Boonville, assisted in surveys and also took charge of some of the installation work, which was done by day labor. The cost of the entire plant was approximately $225,000.

Developing the Engineering Department at West Palm Beach

By T. B. Henry

City Engineer, West Palm Beach, Fla.

THE Engineering Department of the city of West Palm Beach was first established in June, 1923. Colonel E. L. Baird was appointed City Engineer, and proceeded to build up gradually an organization to take care of city work. Previous to the establishment of the Engineering Department, the engineering work of the city had all been done by private concerns. No records of the work were in the possession of the city. Each engineer worked more or less independently of the others, and consequently the work was not coordinated. No policies were set up, because there was no one to define them. No standard specifications were written, because no one had authority to write them and call them standard.

From June, 1923, to March, 1925, approximately 200,000 square yards of pavements were laid, all being built of coral rock, about one-half surface treated with oil and sand and one-half of the penetration type. There were also about five miles of storm sewers laid and a large amount of curb, gutter and sidewalk built.

In February, 1925, C. A. Bingham was appointed City Manager and his first appointment was that of promoting the writer from Assistant City Engineer to fill the position of Colonel E. L. Baird, who had just retired from his post as City Engineer to enter private practice. Previous to Mr. Bingham's coming, the city had been enjoying an exceedingly rapid growth in population, but there had been little effort put forth to provide improvements commensurate in extent or quality with the growth of the city. There remained a sort of civic inertia, or lack of realization of actual conditions, which had to be overcome before the

citizens could be awakened to the fact that improvements in the city were five years behind the normal requirement, and that the situation was rapidly becoming worse.

Largely through Mr. Bingham's efforts, the obstacles were overcome and petitions in great numbers were brought in for paving, sewers, boulevard lighting, and other improvements.

Petitions Closely Followed by Contracts

In less than thirty days after the last petitions were received, bids were taken on paving, lights, and sewers aggregating a total value approximately $3,300,000. The paving types selected were sheet asphalt and Warrenite bitulithic, both on 6-inch concrete base. The sewers were all less than 36 inches in diameter and were built of vitrified clay pipe. The lighting installation consisted of Westinghouse Senior and Junior Sol-Lux tops, using rectilinear glass mounted on Massey Hollowspun concrete posts, connected to multiple-system underground cable designed to operate on 115 volts. The size, spacing, and mounting height varied according to location, which was classified in districts as follows: (1) primary business district; (2) secondary business district and primary traffic artery; (3) residential district and park drive.

Care was taken to establish and maintain a high standard of quality in all of the work. In December, 1925, a contract was let for separate storm and sanitary sewers in the northern section of the city to the amount of $1,750,000. A second contract for sewers in the unsewered area of the central borough aggregating approximately $1,250,000 was let in March, 1926. In July of this year contracts were let on approximately 600,000 square yards of paving, together with curb, sidewalks, catch-basins and other accessories, totaling approximately $3,500,000, and also another contract on sewers in the southern section of the city, approximately $1,500,000, in value. A contract for a further 25 miles of street-lighting extension was let; and in August an additional $500,000 in paving was awarded.

17 Months' Contracts Total $12,000,000

The following are the approximate amounts of the principal items in the twelve million dollars' worth of work constructed and put under contract in the period between March, 1925, and August of this year (seventeen months):

Square feet of sidewalk	2,005,800
Square yards of paving	1,078,179
Miles of curb and gutter	80.2
Cubic yards of grading	891,000
Miles of sanitary sewers	92
Miles of storm sewers	107.2
Number of manholes	2,822
Number of catch-basins	1,863
Miles of boulevard street lighting	50.3

Increased Personnel Necessary

When the Department reorganized, in March, 1925, a bare half-dozen poorly trained men were on the payroll, and it was immediately necessary to build up an organization to handle the proposed work. Good men were hard to get at the salaries then being paid; however, a force was gradually built up, and in midsummer it consisted of fifty men, at that time considered a sufficient number to carry on the work in the volume and at the speed contemplated. As time went on, however, more and more work was proposed and extensive surveys and investigations had to be carried on for handling the matters connected with the acquiring of right of way for widening some 12 miles of principal streets. A Right-of-Way Division became necessary and now numbers fifteen men, working full time. Work has been speeded up to such an extent that there are almost fifty inspectors on our payroll, but even with that number it is sometimes necessary for one inspector to work two jobs. In order to make the necessary surveys and to keep the work laid out ahead of the contractor, a total of twenty-one field parties are now working at top speed. Fifteen draftsmen are required to take care of the office work. The total number of employees in the Engineering Department is 193, of whom 40 are in the Labor Division on detour maintenance.

The various divisions of the work are under the direct supervision of an efficient corps of assistants.

B. F. Darling, formerly Sewer Engineer of Lima, Ohio, is in charge of sewer construction. T. T. Dawson, formerly Engineer for the city of Durham, N. C., under the direction of the Superintendent of the Department of Public Works, is in charge of the paving work. H. N. Tschirgi, formerly of Des Moines, Iowa, where he acted in a consulting capacity on improvement work for many towns and small cities in that community, is in charge of all work not specifically included in sewer and paving programs. W. A. Mueller, formerly with the Illinois State Highway Department, is office manager. Arthur L. Cornell, formerly engineer in charge of construction for the Mizner Development Corporation at Boca Ratone, Florida, is in charge of pavement design. C. H. Holstlaw, formerly County Engineer of Palm Beach County, is the executive assistant, and John Jewhurst, formerly City Engineer of

Lima, Ohio, is acting as assistant to Mr. Darling on sewer construction. Almost every state in the Union is represented among the other members of the Department. Almost every important state highway organization and the engineering departments of many large cities have contributed to the experience of our personnel.

Consultants

Expert advice has not been lacking. The firm of Fuller & McClintock were employed in the summer of 1925 as consultants on sewerage and sewage disposal. They have designed the sewers now under construction, and are at present engaged in the designing of a complete system of interceptors, pumping-stations, and sewage treatment plant. Charles W. Leavitt is our advisor on city planning matters, and under his direction we are developing comprehensive plans for large projects in the westerly area of the city. Harvey P. Jones, of Toledo, Ohio, formerly with Fuller & McClintock, is also advising us on the westerly area project and on sewerage and drainage matters. We are holding final public hearings on the zoning plans for the city, devised by Robert Whitten, zoning expert, of New York City. The Randall Company, of Toledo, Ohio, is at present engaged in a three-year program which provides for a controlled precise survey and the monumenting of the entire city area. The John N. Chester Engineers of Pittsburgh are the city's consultants on water problems.

Office Facilities

When the Department was first organized, it occupied two small offices in the building adjacent to the City Hall. These offices were adequate until the commencing of the large program in the summer of 1925. At that time another small room was secured and some hall space utilized, and later on two more rooms in another nearby office building. Such quarters, however, were entirely unsatisfactory for a large organization. The men were so crowded and so frequently interrupted that they worked at very low efficiency. Matters continued to grow worse until in February, 1926, it was decided to build a new office building solely for the Engineering Department. The Department is now housed in its new building.

The necessary private offices occupy one end of the structure. A large, well-lighted drafting-room, containing thirteen individual drafting tables and two layout tables, takes up the middle of the building. Back of the drafting-room is a masonry vault in which are stacked the steel filing cabinets, and in another compartment, individual lockers in which each field party keeps its instruments and tools—a total of thirty-seven instruments. In one corner of the building we have a blue-print room in which is installed a 54-inch Pease continuous blueprinting machine, which enables us to save about 4 cents per square foot on our blueprinting. (The local price for blueprinting is 6 cents per square foot.) Back of the vault a large room is provided for the field men to gather in, since they are not permitted to come into the drafting-room and cause annoyance and interruption to the men working there. Two toilet rooms are provided, one opening into the field men's room and one into the drafting-room. Electric computing and adding machines constitute another item of the equipment. The Department does all blueprinting and mimeographing for all the departments of the city at a small fraction of the regular commercial rates.

The Department owns ten cars for the principal engineers and pays car allowance of $65 a month to about a dozen who operate their own cars on city work. The Labor Division working on detours and street patching after sewer construction operates sixteen 3-yard trucks and five graders, rollers, etc.

The design and construction of public buildings such as the new jail and the municipal garage and the supervision of construction of the municipal market is all done by the Engineering Department, as well as work incidental to the three-million-dollar bond issues voted last year for general improvements of parks, water-front, and playgrounds.

Largest Installation of Highway Lighting Completed

THE placing of 250 G. E. Novalux highway lighting units on the 15 miles of road leading from South Jacksonville, Fla., to Pablo Beach completes the largest installation of highway lighting in the country. The lights are spaced 300 feet apart on a pole line set for the purpose and are on one side of the highway only. They operate 250-candlepower lamps and are 30 feet above the surface of the highway.

As this is the main thoroughfare leading from South Jacksonville to the beach, the traffic during the summer is very heavy. Until recently the brick highway was too narrow for the amount of traffic it carried and there was no lighting equipment. It is now a double concrete highway, and since the lighting units have been installed there has been a noticeable decrease in the number of accidents that have occurred there.

Chlorination—A Reserve Protection? Or an Integral Part of Purification?

By H. W. Streeter

Sanitary Engineer, U. S. Public Health Service

THERE has been much discussion of the question whether, in fixing requirements for the efficiency of water filtration plants, chlorination should be held in reserve as a factor of safety, or whether it may be regarded as an integral part of the purification process. Recent studies by the Public Health Service have indicated a possible basis for a compromise between the two extremes of policy, neither of which—the one involving the total exclusion, and the other, the entire inclusion, of chlorination as a recognized stage of water purification plants—provides an entirely safe or economical working basis for administrative control of their operation, from the standpoint of the state sanitary engineer.

As bearing on the question above stated, reference is first made to Table No. 1, prepared from the combined data of ten Ohio River plants, showing the relationship observed as between the yearly mean B. coli index of the effluents produced by these plants and the frequencies with which the index on individual days exceeded the respective limits specified. It will be noted that the observed frequency of occurrence of a B. coli index exceeding the Treasury Department standard limit, 1.0 per 100 c. c., was slightly more than 50 per cent. If chlorination were admitted as an integral part of the purification process and it were required to produce a chlorinated effluent having an average B. coli index not greater than 1.0 per 100 cubic centimeters, a plant would be expected, on the basis of this evidence, to produce an effluent of poorer quality than the standard during slightly more than half of the time. Similarly, it is shown in the table that if the standard limit were 2.0 or 4.0 B. coli per 100 cubic centimeters, and a given effluent contained average numbers of this organism corresponding exactly to these respective figures, the frequency with which they would fail to meet the standard likewise would approximate 50 per cent. Obviously, the inclusion of chlorination and the basing of a standard of efficiency on an assumption such as above described would be an unsafe procedure in that no factor of safety would be allowed to cover a high percentage of deterioration in the quality of the chlorinated effluent below the limit fixed by a given quality standard.

TABLE I

RELATIONSHIP BETWEEN YEARLY MEAN B. COLI INDEX OF EFFLUENTS OF OHIO RIVER PLANTS AND PERCENTAGES OF FREQUENCY WITH WHICH THE INDEX ON INDIVIDUAL DAYS EXCEEDED THREE SPECIFIED LIMITS

Yearly Mean B. Coli Index per 100 cc.	% Frequency in Excess of: 1.0 per 100 cc.	2.0 per 100 cc.	4.0 per 100 cc.
0.1	**3**	**2**	1
0.2	**6**	**4**	2
0.3	**10**	**5**	3
0.5	23	10	5
1.0	**54**	32	10
2.0	70	**51**	23
3.0	76	61	38
4.0	78	67	**50**
5.0	80	71	58

NOTE:—Figures referred to in the text are in bold type.

Considering, next, the alternative proposition, let it be assumed that requirements for plant efficiency were based solely on their performance without the aid of chlorination, which would imply that chlorination in itself is the factor of safety and that the plant must deliver an unchlorinated effluent conforming to some given standard, such as that of the Treasury Department. In order to illustrate the application of this assumption, reference is made to Table No. 2, the figures in which have been derived from a plot of the relation observed between the B. coli index of the raw water and that of the unchlorinated effluent at three Ohio River plants, which were the only ones of the group studied producing unchlorinated effluents conforming to the revised Treasury Department standards for a sufficiently high proportion of the time to permit a relationship curve of the kind to be drawn from their performance.

It will be noted in Table II that the maximum B. coli index consistent with producing an unchlorinated effluent conforming to the Treasury Department standard is equal to 60 per 100 cubic centimeters. It may be added in this connection that the limiting figure given has been confirmed very closely by corresponding results obtained from the experimental studies of the question which have been in progress at the Stream Pollution Investigations Laboratory at Cincinnati during a period of twenty months. In the same table it is indicated that in order to produce unchlorinated effluents conforming to the original Treasury Department B. coli standard (i.e., 2.0 per 100 c.c.), it would be necessary to deliver raw

TABLE II

RELATION BETWEEN B. COLI INDEX OF THE UNCHLORINATED FILTER EFFLUENT AND CORRESPONDING B. COLI INDEX OF RAW WATER, CONSISTENT WITH FORMER (DERIVED FROM COMBINED DATA FROM THREE OHIO RIVER PLANTS)

B. Coli Index of Unchlorinated Filter Effluent (per 100 cc.)	Corresponding B. Coli Index of Raw Water (per 100 cc.)
1	60
2	270
3	650
4	1,200
5	1,900
6	2,900
7	4,000
8	5,400
9	7,000
10	8,800

waters containing not more than approximately 270 B. coli per 100 cubic centimeters.

The application of either one of the two requirements just stated obviously would entail a heavy burden of expense for stream-cleaning measures which would be necessary, in many cases, to reduce the bacterial pollution of raw water-supplies to an amount within the limits indicated. In rivers such as the Ohio and others of similar type, it is doubtful whether the maximum degree of such measures possible, even at great expense, would insure the delivery of raw water-supplies containing numbers of B. coli as low as are represented by an index equal either to 60 or to 270 per 100 cubic centimeters. It would appear, therefore, that unless feasible measures can be taken to secure a more highly efficient removal of bacteria without the aid of chlorination, a large majority of filtration plants of the rapid-sand type, such as have been under observation by the Public Health Service, are very considerably overburdened at the present time, as far as the production of unchlorinated effluents conforming to the Treasury Department standard is concerned, and are likely to remain overburdened in this respect unless drastic and, in some cases, virtually impracticable measures can be taken, through extensive stream-cleaning programs, to relieve such overburden.

Compromise Possible

In view of the foregoing considerations, it would appear that a compromise of some kind, if practicable, might be desirable as between the two extreme policies in respect to the inclusion or the exclusion of chlorination which have been mentioned above. It is proposed to describe a suggestive basis for such a compromise, which has been discussed more fully in a report of the U. S. Public Health Service on the efficiency of ten municipal water purification plants. The procedure suggested is submitted, not as a final one in any sense, but merely as one of several possibilities for the consideration of those who have in hand the administrative control of filtration plant efficiencies and permissible limits of raw-water pollution.

As a basis for such a procedure, let it be assumed that instead of taking chlorination as the factor of safety, a definite numerical factor be assigned such that the average B. coli index of the chlorinated effluent shall be some specified fraction of the maximum limit prescribed by a given standard of quality, such as, for example, the revised Treasury Department standard. Thus, if the factor of safety be 5, the required average B. coli index of the chlorinated filter effluent would be not greater than 0.2 per 100 cubic centimeters, as figured on the basis of the limit imposed by the Treasury Department standard. With a relationship established between the B. coli index of the chlorinated effluent and that of the unchlorinated effluent, as shown in Figure 1,* the fixing of a given requirement for the former should, in turn, define a maximum limit of the latter consistent with fulfilling such a requirement. The curve shown in Figure 1 indicates that in order to produce a chlorinated effluent having a B. coli index not exceeding 0.2 per 100 c.c., the corresponding index of the unchlorinated filter effluent should not be greater than approximately 4.6 per 100 cubic centimeters. Although the curve in question is subject to probable readjustment after the results ob-

* Reproduced from the report to which reference has been made above. Based on combined data obtained from ten Ohio River plants.

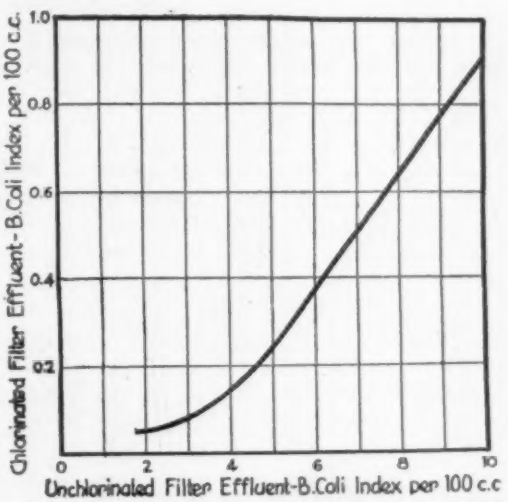


FIGURE 1.—RELATION BETWEEN B. COLI INDEX OF UNCHLORINATED FILTER EFFLUENT AND CORRESPONDING INDEX OF CHLORINATED FILTER EFFLUENT

tained from current experimental studies at the Laboratory of Stream Pollution Investigations at Cincinnati have been carefully checked against those secured from the surveys of municipal filtration plants, it will serve to illustrate the principle involved.

Proceeding in a similar manner, the following tabulation may be made of the required limiting average B. coli index of unchlorinated and chlorinated filter effluents, corresponding to given assumed factors of safety as above defined and based on the relationship curve shown in Figure 1:

TABLE III

Assumed Factor of Safety	Limiting Average B. Coli Index per 100 cc. Chlorinated Filter Effluent	Unchlorinated Filter Effluent
20	0.05	1.0
10	0.10	3.2
5	0.20	4.6
4	0.25	5.1
3	0.33	5.7
2	0.50	7.0

On referring to the tabulation above, it will be noted that with the highest assumed factor of safety, 20, the indicated B. coli index of the unchlorinated filter effluent is exactly equal to the limit fixed by the Treasury Department standard. Under the conditions of these observations, therefore, chlorination may be said to provide a factor of safety roughly equivalent to 20, as expressed in the terms above defined. With lower assumed safety factors, the limiting permissible B. coli indices of the unchlorinated effluent would become progressively greater, as shown in the tabulation.

The question as to what particular factor of safety may provide an adequate working margin may be decided arbitrarily, or, perhaps more logically, on a basis of the frequency with which the B. coli index of the chlorinated effluent, its average amount being fixed by the factor chosen, might be expected to exceed the limit imposed by the Treasury Department or other approved standard. As an example of the manner in which the factor might be selected on the latter basis, let it be assumed that the factor would be exactly 3. Under these conditions, the required average B. coli index of the chlorinated effluent would be 0.33, and the equivalent mean index of the unchlorinated effluent, 5.7, as determined from the curve in Figure 1.

On referring to Table I, the expected frequency of occurrence of an index in excess of 1.0 per 100 c.c., corresponding to a mean index of 0.33, may be estimated, by interpolation, as being approximately 12 per cent. If the factor of safety chosen, therefore, were exactly 3, the B. coli index of the chlorinated effluent would be expected, on this basis, to conform to the revised Treasury Department standard during about 88 per cent of a normal year. Similarly, if the factor were 5, the expected frequency of non-conformance to the standard would be 6 per cent, and of conformance, 94 per cent.

By reversing the process above described, the limiting average B. coli index of a chlorinated effluent consistent with its conformance to the Treasury Department standard for a specified proportion of the time can readily be estimated. Let it be assumed, for example, that the yearly mean index shall be of magnitude such that the index on individual days (or of individual samples) shall not exceed the Treasury Department standard limit for more than 10 per cent of the time. On referring to Table I, the yearly mean B. coli index of the effluent corresponding to which the frequency in excess of the limit stated is 10 per cent is shown to be 0.3 per 100 cubic centimeters. In Figure 1, the corresponding mean index of the unchlorinated effluent is given as 5.5 per 100 cubic centimeters. With this assumed condition, the factor of safety, as above defined, would be 3.3, which would appear to offer a fair working margin of safety for efficiently operated plants treating raw waters not subject to wide and sudden fluctuations in their bacterial quality.

In the last analysis, however, the particular factor of safety adopted for a given condition would depend, not only on the factors above mentioned, but also on others which frequently are incapable of precise evaluation. A possible instance of this kind has been suggested by Abel Wolman,* and concrete examples are found at points along the Great Lakes, where the conditions under which water purification plants are operated are often considerably more hazardous than at points located along flowing streams, owing to the presence of a number of factors which frequently cause extremely wide and sudden hourly changes in the bacterial character of the raw water, unaccompanied, however, by corresponding physical changes, which otherwise might serve as a guide for readjustments in the treatment. For plants thus situated, the factor of safety adopted with respect to the efficiency of chlorination necessarily would be higher than for plants located on flowing streams and treating raw waters of more nearly stabilized quality from hour to hour.

* Journal American Water Works Association, Vol. 13, No. 2, February, 1925, pp. 232-236.

Summary

The method which has been described for fixing a working factor of safety for chlorination in connection with filtration represents a compromise between the views of those who would admit chlorination as an integral part of water filtration processes and those who would regard it wholly as a factor of safety. It has been shown that on the basis of the tabulation given in Table III, chlorination provides a safety factor equivalent roughly to 20, expressed in terms as defined. It would appear, from the evidence afforded by frequency data such as are exemplified in Table I, that a factor of safety of this magnitude is higher than ordinarily is necessary or justified by the usual exigencies of filter plant operation, though in some instances, as above noted, a considerably higher factor would be advisable than in other cases. In the most extreme circumstances, however, it would hardly seem that a factor greater than 10 would be required to provide an adequate working margin of safety. Under ordinary conditions, such as exist along most of our inland flowing streams, a factor as low as 5 or thereabouts might be sufficiently high for safety, in so far as is shown by the results obtained from the surveys of municipal plants along the Ohio and other streams, to which reference was made at the beginning of this discussion.

From these considerations, the classification in Table IV or one drawn up on similar lines, might be suggested as a basis for prescribing working factors of safety.

In class A might be placed plants treating waters of high and extremely variable bacterial content and of relatively low turbidity, a combination presenting great difficulty to the plant operator and necessitating a high degree of dependence on chlorination. In class B might be found plants treating waters of less average pollution, of less variability over short periods and of higher turbidity. In class C would fall plants operating under still more favorable conditions with respect to the three factors named, or plants treating raw waters such as might be found under class B but provided with more highly elaborated facilities, aside from chlorination, for dealing with such waters; such as, for example, plants using double-stage sedimentation or filtration. The classification given is admittedly a loose one, however, and is cited merely for the purpose of illustrating the suggested method of analysis of the problem. The ultimate choice of a classification of this kind probably must rest, finally, on a more thorough understanding of the complexities involved in the variability of different raw waters in relation to their average quality than is available at the present writing; likewise in a more precise definition of the several elements which enter into the determination of safety factors for water purification processes. Possibly some of these elements cannot be defined in anything more than general terms, and an arbitrary classification might prove to be the more feasible one for all practical purposes.

TABLE IV

Class	Factor of Safety	Limiting Yearly Average B. Coli Index per 100 cc. Chlorinated Filter Effluent	Unchlorinated Filter Effluent†
A	10	0.10	3.2
B	5	0.20	4.6
C	3	0.33	5.7

† Based on curve shown in Figure 1; subject to probable readjustment on results obtained from further studies.

ACKNOWLEDGMENT.—From a report presented to the Conference of State Sanitary Engineers, June, 1926.

Medical Society Decries Smoke as Health Menace

CLASSING the smoke problem in St. Louis as the city's "worst civic and personal nuisance," the Committee on Smoke Abatement of the St. Louis Medical Society asks the citizens of the community to unite in a fight for the abatement of this menace to their health and well-being. The ill effects of the pollution of the air by smoke are discussed in detail in a report of the Committee recently made public:

"The smoke condition has become so severe and the bad effects so definite that the Society feels that it should express the sentiments of its members, who are daily observing highly detrimental effects upon the health of our citizens, young and old, and convalescents in hospitals and homes.

"The permanent deposits of carbon in the lungs and the thickening of the air passages must reduce the normal lung capacity. This in turn definitely lowers the general vitality and resistance to disease. Chronic diseases of the nasal sinuses, throat and deeper air passages of the lungs are aggravated, prolonged and often rendered incurable. The failure of proper interchange of gases in the lungs also causes mental sluggishness and depression."

In view of these definite effects on both bodies and minds, in addition to the well-recognized economic losses through constant cleaning in households and places of business, the Society believes that the city of St. Louis should attempt to find some scientific method of solving this problem for all time and urges a concentrated effort of the entire citizenship toward the elimination of the smoke nuisance.

Parades and the Street-Cleaning Problem

By Arthur A. Taylor

Commissioner, Department of Street Cleaning, New York City

EVERY city, town, and village in the United States at one time or other has its parade, which is always accompanied by a cluttering of the streets with papers and refuse let fall by those witnessing the spectacle.

The line of march in welcoming distinguished people to New York City is usually from the Battery to the City Hall on Broadway, running through the heart of the financial district. Enthusiastic clerks, since the first great Armistice celebration in 1918, have developed the habit of promiscuously scattering the contents of wastebaskets and miles of ticker tape out of the windows as a means of expressing their joy at welcoming the distinguished personage being escorted up Broadway. This has developed an intensive street-cleaning problem which has been solved through a special organization of the forces of the Department of Street Cleaning.

The area from the Battery to City Hall, with the abutting side streets, is thoroughly flushed the morning of the parade in time for the street to be dry before the parade starts. After the flushing, a sweeper is assigned to each block on the line of march to keep the roadway clean until the parade approaches.

After the parade passes, the sweepers are ganged at the starting point of the parade, sweeping in gangs behind flushing machines which wet down and flush all the paper used in the demonstration toward the curb, following up the entire line of march until all the paper is piled. Two rubbish trucks follow up these sweepers, loading the paper that they pile. After Broadway has been cleaned, the organization of sweepers is split in half. One half works the side streets from Broadway to Church Street on the west side, and the other works from Broadway to Nassau Street on the east side.

The special organization to take care of the aftermath of these demonstrations consists of forty sweepers, two flushing machines, and two paper trucks with four loaders. There are usually about seven truck loads of paper collected after a demonstration, amounting to 98 cubic yards of material. The average time consumed in cleaning up is about three hours.

Wide World Photo

A TYPICAL ENTHUSIASTIC WELCOME ON BROADWAY, NEW YORK, SHOWING LITTER ON THE STREETS
Demonstrative and enthusiastic throngs welcoming Gertrude Ederle upon her return to the United States after her record-breaking English Channel swim

Meter Reading and Billing of Metered Water Accounts in Baltimore

V. Bernard Siems, C. E.
Water Engineer, City of Baltimore, Md.

IN Baltimore the continuous system of reading meters is used, that is, meter reading continues throughout the entire year. The territory supplied by the Bureau of Water Supply, representing approximately 175,000 water-supply services, of which 33,000 are metered, is divided into six districts, namely, western, northwestern, northern, northeastern, southeastern, and county. The statements of the meters are obtained quarterly, and two weeks is allotted for their reading in each district.

The average number of accounts to be read daily, totaling from 85 in the sparsely populated districts to 150 in developed sections, are inserted, properly routed, in one Kalamazoo handbook binder. The meter reader is required to complete one handbook every day. He is responsible for the accurate recording of the correct reading of the meters, and the procuring of necessary billing information, such as correct name and address of the account, date when premises were first occupied, whether property is a vacant lot, or the house is being erected, etc. The reader is directed to make the deduction of the present reading from the prior statement at the site of the meter, obtaining the amount of consumption and comparing it with the prior quarter or corresponding period of the previous year. When a great discrepancy in consumption is shown, he tests the meter and reports whether it is registering.

Large Meters Are Read More Frequently

In addition to the regular reading, the statements of meters 3-inch in size and larger are obtained between quarterly reading dates by a special meter-reading and repair crew consisting of a water-meter repairman and a helper. The 6-inch and larger meters are read at least once a week, the 4-inch every two weeks, and the 3-inch about every three weeks. The reading and registration for the current period is procured by the special reader at the location of the meter, and is carefully scrutinized by him to determine whether the percentage of accuracy of registration is below the practical limit or whether the meter has ceased to register. By familiarizing himself with the operation of the plant and comparing the current consumption with that of a previous or corresponding period of a former year or with the registration of other plants engaged in a similar business, he is able to determine whether the meter should be examined for accuracy or replaced by a new one. Minor repairs on meters are made immediately by this special crew. Reports of the condition of the large meters are made daily, and if major repairs or renewals are required, they are executed by meter repair crews at once.

MAYOR AND CITY COUNCIL OF BALTIMORE
BUREAU OF WATER SUPPLY
RECORD OF METER READINGS

AMBROSE H. BAILEY, AHB
1120 MARIMENT AVE. 54857
H 29
156 A

DESCRIPTION APPL. NO.	INSTALLED	SIZE AND KIND	METER NO.	DIAL LIGHT	REMOVED
39457	6/8/22	5/8" U. P.	641 914	100 M	

METER LOCATED 12 ft. W. of W.b. l. of house

CLASS

DIFF ACCT. DATA GOSUP. 10/12/23 SD. ACCT. DESC., INST.

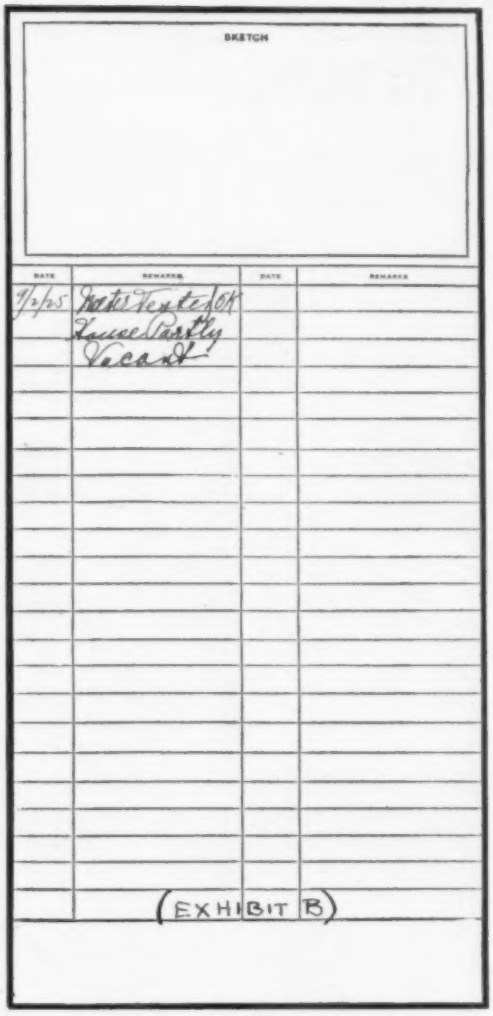
OPEN METER ACCT. CLOSE FLAT DATE

SPECIAL DATE

DATE	READINGS	DIFFERENCE	DATE	READINGS	DIFFERENCE
9/2/25	784				
9/2/25	804	20			
12/4/25	826	22			
3/3/26	853	27			
6/2/26	876	23			
9/2/26	893	17			

(EXHIBIT A)

METER READER'S HANDBOOK FOLIO


SKETCH

DATE	REMARKS	DATE	REMARKS
7/25/25	Water Tested OK Found Slightly Vacant		

(EXHIBIT B)

REVERSE OF HANDBOOK PAGE

The function of the special reading crew is to detect non-registration or perceptible decrease in accuracy of registration as soon as possible. With this procedure, the meters are maintained in good condition at all times, registering all of the water passing through them. It has been the experience of this Bureau, particularly on the larger-size meters, that there is a marked decrease in the percentage of accuracy of registration during a period of about three quarters, nine month, prior to the date when the meter becomes entirely defective. When one considers that there are 770 meters 3-inch in size and larger in service in the territory supplied by the Bureau of Water Supply, registering about 500,000,000 cubic feet yearly, from which an annual revenue of $500,000 is received, it is evident that the increase in revenue due to executing repairs promptly and thereby maintaining the percentage of accuracy close to 100, greatly exceeds the cost of operation of the special meter-reading crew.

Forms for Meter Reading

Exhibit A shows a meter reader's handbook folio. Application for water service is made at the office of the Bureau of Receipts, where an addressograph plate is stamped with the name and address of the account. Handbook folios are then placed in the addressograph machine and this information recorded on the sheets. The handbook folio, together with the application for service, is then forwarded to the Bureau of Water Supply, Distribution Division, the plate being retained at the office of the Bureau of Receipts and placed in a file designated "New applications not installed." The order directing the installation of the water-supply service is sent to the Maintenance Subdivision, or to the Construction Subdivision, when an extension of water-main is required, and the handbook folio is given to the Meter Subdivision of the Distribution Division, where it is filed and also designated "New applications not installed." After the water-supply service, vault, and connections are installed, the order, together with information on the probable date of installation of meter, is forwarded to the Meter Subdivision, under whose direction the meter is placed. After the meter is set, the service application number, date of installation of meter, meter number, size, kind, reading, and location of meter, and other billing information, are placed on the handbook folio. It is then properly routed, assigned a handbook number and a folio number, and inserted in the meter reader's handbook. The original application, bearing the handbook and folio numbers, is returned to the Bureau of Receipts, where this information is placed on the addressograph plate, which is now placed in the active file in handbook and folio number sequence.

On the reverse side of the handbook page, shown in exhibit B, the meter readers make their notations and reports. A sketch giving the layout and measurements of the meter setting is also placed on this side of the sheet when the location cannot be described accurately.

Office Handling of Meter Readings

When the complete handbook is returned by the meter reader, each account is carefully reviewed by clerks who check the mathematical deduction, note that all necessary billing information is correctly entered on folio, scru-

tinize the amount of consumption for the current period, issue inspection orders for check reading and examination of meter in cases where there is marked discrepancy in registration which could not be accounted for by the meter reader, and issue orders for the repair or renewal of meters and vaults in accordance with conditions reported by the reader. The handbook is then forwarded to the office of the Bureau of Receipts. Here the bills, exhibit C, are placed in an addressograph machine, and the name, address, handbook number, and page number, which also serves as the account number, stamped on them. As the addressograph plates are placed in the machine in handbook and folio number sequence, the addressed bills are now ready for the transfer-task. The application of these principles of modern organization to meter reading and billing of metered water acounts is the continuous system of reading meters. The system eliminates peak conditions and permits the influx of a uniform amount of work. It allows the reader to perform meter reading only, the meter repair man to make meter repairs, and the inspector to investigate complaints, each individual thereby becoming proficient and especially skillful in his task.

In Baltimore, when the periodic method of reading meters was in use, six meter readers with helpers were employed for two months during each quarterly period, the remaining month being spent in the investigation of complaints and the repair and replacement of non-

BALTIMORE CITY
CITY METERED WATER
1925-1926

AMBROSE H.BAILEY, AMB 24857 H 29 156 A
4120 MARIMONT AVE.

9-2-26

6-2-26	AMOUNT	CREDITS
MINIMUM CHARGE		
AS PER RATE 1780	3.40	
10 CT. RATE		
7½ CT. RATE		
SPECIAL RATE		
TOTAL		
BILLS RENDERED		
6-2-26	4.60	

This stub is retained at the office of the Bureau of Receipts as a ledger record.

TO THE MAYOR AND CITY COUNCIL OF BALTIMORE, Dr.
BUREAU OF RECEIPTS—CITY HALL HOURS 9 A. M. TO 2 P. M. SAT. 12 NOON
MAKE ALL CHEQUES PAYABLE TO CITY COLLECTOR.—BALTIMORE

AMBROSE H.BAILEY, AMB 24857 H 29 156 A
4120 MARIMONT AVE.

METER READINGS IN HUNDRED CU. FT.
9-2-26 LAST READ. 893
6-2-26 PREV. READ. 876
DIFFERENCE 17

All complaints should be sent to the Water Engineer, accompanied by this bill.
THIS BILL IS NET
DUE IN TEN DAYS

	AMOUNT
MINIMUM CHARGE 3/4 INCH METER	
1700 CU. FT. AT 20 CTS. PER HUNDRED	3.40
CU. FT. AT 10 CTS. PER HUNDRED	
CU. FT. AT 7½ CTS. PER HUNDRED	
SPECIAL AT PER HUNDRED	
TOTAL CURRENT CHARGES	
BILLS RENDERED	
6-2-26	4.60
TOTAL	8.00

EXHIBIT C

If receipt is required, return entire bill.
CITY METERED WATER 1926
CASHIER'S STUB 7-1

AMBROSE H.BAILEY, AMB 24857 H 29 156 A
4120 MARIMONT AVE.

9-2-26

6-2-26	AMOUNT
M. C.	
1700	3.40
10 CTS.	
7½ CTS.	
SPECIAL	
TOTAL	
M. R.	
6-2-26	4.60
TOTAL	8.00

SAVE TIME
PRESENT THIS BILL WITH YOUR PAYMENT.
THIS BILL IS NET DUE IN TEN DAYS

COMPLETE BILL AS PREPARED IN OFFICE

ring of readings from the handbook. The meter readings and consumption shown on the handbook are noted on the bill by clerks. The bill is then put in a specially designed billing machine, which places the amount in dollars and cents on it. The bill is then folded, placed in an open-faced envelope and mailed.

Advantages of Continuous Reading and Billing

In any industry or line of endeavor it is always economical to so arrange the work as to permit a uniform production, and in order to obtain efficient and economical operation, the management and organization must provide for the intelligent subdivision of labor and the specialization of individual effort so that the employee is given the opportunity to confine his work to some task for which he has a special aptitude, and is permitted to become particularly skillful in the performance of that registering meters. With the present system of continuous reading, five meter readers, having no helpers, read the meters throughout the entire year. When the periodic system was in use, there were 27,000 meters in service and the cost of reading averaged $.355 per meter per year. With the continuous method, the cost of reading 33,000 meters is $1.97 per meter per year, a decrease of 45 per cent.

The old system of periodic reading permitted the accumulation of complaints and non-registering meters during the two-month reading periods, causing the consumer to become dissatisfied and aggravated because his complaint was not answered promptly, and a loss of revenue due to not removing the defective meters expeditiously. With the continuous system, complaints are answered within ten days, and non-registering meters are repaired or replaced within a week from date of report.

Arson as a Moral and Legal Problem

By F. R. Morgaridge

Assistant to General Manager, National Board of Fire Underwriters

IT has long been recognized that the four cardinal principles of fire prevention are, first, proper building construction; second, inspection and removal of hazardous conditions; third, a campaign of education and publicity; and, fourth, rigid investigation and prosecution of incendiaries.

I contend that we may well reverse the order of these four principles and place first on the list the campaign against the incendiary. How much of the total fire loss is really due to arson will probably never be accurately known, but it is certain that a considerable part of the five-hundred-million-dollar fire loss in this country is not accidental.

The fire of accidental origin is usually a slow-burning fire, and ordinarily an easy one to control, but a fire of incendiary origin in a building probably saturated with some volatile oil is a potential death-trap, and I am confident that more than fifty per cent of the firemen injured and killed each year in line of duty are in reality the victims of arsonists. Any man who commits the crime of arson is a cold, deliberate, perverted criminal. This crime cannot be committed in the heat of passion. Accident cannot in any way contribute to it.

In my judgment most of us have a tendency to underestimate the actual incendiary loss. Now what leads me to this conclusion?

We all know that during the period of the late war, the moral hazard was almost non-existent, values were constantly rising, business was prosperous, and incendiary fires for insurance were few and far between. In 1920, in the period of readjustment beginning just after the close of the war, business conditions were not satisfactory, failures and bankruptcies were not uncommon, and the companies reporting to the National Board of Fire Underwriters paid out for losses in 1920 $100,000,000 more than for either 1918 or 1919. Was this a reflection of the moral hazard? It is worthy of note that in any city in which there has been conducted a rigid investigation of incendiary loss, with resulting publicity and convictions, the fire loss has immediately shown a material and striking decrease.

Motives Which Lead to Arson

In his address on "The Pith of Prevention," before the recent New Orleans convention of the International Association of Fire Engineers, excerpts from which comprise this article, Mr. Morgaridge listed four motives which prompt incendiaries to burn:

(1) To conceal crime. Some fires are set to cover up evidences of some other crime, such as the burning of a mercantile building to conceal the theft of merchandise therefrom.

(2) Malice or revenge. Included in this class are all those fires in which one person maliciously burns the property of another because of some enmity which he has against him.

(3) Pyromania or other forms of mental derangement. Under this head are all those fires set by the true pyromaniacs, and, in addition, all those fires which are set without any apparent reasonable motive.

(4) The largest and most important group includes those fires which are set with intent to defraud the insurers.

Laws Against Arson

In view of the fact that there is no uniformity in the laws covering arson and burning in the various states, and that there are some apparent weaknesses, the Fire Marshals' Association of North America a few years ago prepared and adopted a suggested Model Arson Law. We believe that this suggested law covers every wilful and malicious burning that can be ceived, and we have no hesitancy in recommending it as both concise and comprehensive.

Arson was originally an offense against the habitation. It consisted in the burning of the habitation of one man by another. The impelling motive was revenge, and malice was an essential ingredient of the crime. In some states arson still consists in the burning of certain buildings *of another*, and in these states arson is a crime against the security of the habitation rather than against the right of property. In these states, therefore, a tenant in possession of a certain building which he has set on fire cannot be indicted for arson, unless there are other tenants in the building, in which case he may be indicted, charged with burning the building of one of the other ten-

A THREE-HOUR ATTACK WITH FIFTY HOSE STREAMS SUPPLIED BY PUMPERS FROM SIX CITIES WAS REQUIRED TO EXTINGUISH THIS $1,500,000 FIRE IN LOWELL, MASS.

This fire, of unknown origin, started in the basement of one of the A. G. Pollard department store buildings in the heart of the city, swept through unprotected basement openings to adjoining structures of the same store, completely demolishing them. Inferior construction, absence of sprinkler protection, and the large amount of highly combustible stock in the basement, were the factors reported by the National Fire Protection Association as responsible for the rapid spread of the flames, which caused the collapse of the third and fourth floors of the adjoining Masonic Temple in addition to widespread smoke and water damage to many other buildings in the vicinity

ants.

In other states arson is defined as burning certain buildings, the *property of another*. This is a somewhat broader law than the one first mentioned, and under it a tenant may be indicted for arson, charged with burning the property of the landlord. However, under such a law the owner of a vacant building or the owner of a building of which he has sole possession cannot be indicted for arson, accused of burning such building.

Under most of the arson laws of our states, therefore, it is necessary to allege either ownership or occupancy in an indictment or information. Most of the complexities that arise in the trial of an arson case are due to the necessity of alleging and proving this question of ownership or occupancy. Under the suggested Model Arson Law it is not necessary to allege that the building burned is the habitation or the property of any person. All that it is necessary to allege and prove is that a certain building at a given location was set on fire or burned by the defendant. In other words, the indictment or information must only be sufficiently explicit to let the defendant know the crime of which he is accused.

In many states there is a section of the arson law which defines *burning with intent to defraud*, and there is room for great improvement in the statutes of some states relating to this particular crime. For example, in some states a person who sets fire to and burns any building or any merchandise contained therein with intent to defraud the insurer can be convicted of burning with intent to defraud and sentenced to the penitentiary. There is no provision made, however, for the burning of merchandise that is *not* contained in a building, even though the fire is set with the intent to defraud the insurer. Thus, for example, a man who sets fire to and burns $10,000 worth of silk stored in a building, with intent to defraud, can be prosecuted, but the same man who sets fire to the same silk that is outside a building—on a truck, for example—cannot be prosecuted under the burning to defraud statutes of that state.

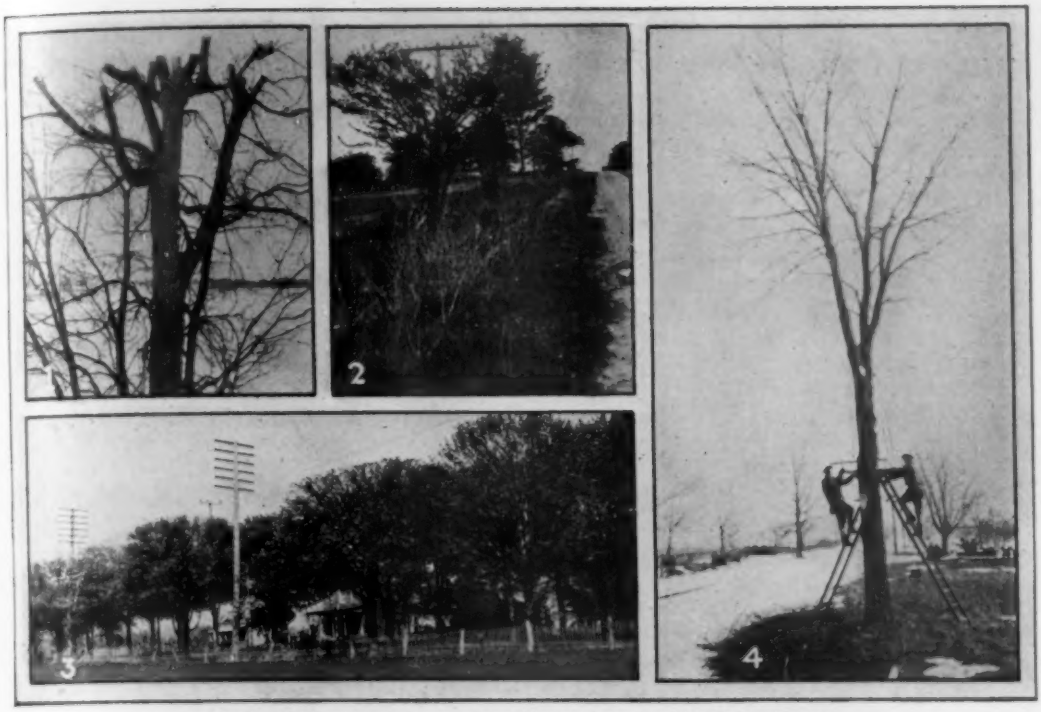
In most of the states some section of the arson law defines the burning of personal property *of another*. Many of them contain a section similar to this: "Whoever wilfully and maliciously burns a pile or parcel of wood, boards, or timber, or any fence, bars, or gate, or any stack of grain, hay or other vegetable product, the property of another, shall be imprisoned in the penitentiary, etc." In this day and age nobody burns a pile of boards or a fence, but they do burn personal property of more value, such as automobiles, for example, and these laws should be corrected along the line of the suggested Model Arson Law.

Cooperative Home Ownership in the United States

As part of a general study of cooperative organizations, the United States Bureau of Labor Statistics has collected data on the housing societies which have been formed in some large cities in an effort to meet the shortage of moderate-priced homes—the type for which there is the greatest need and which the private builder is making the least effort to supply. In a summarized report of this study which appeared in a recent issue of the *Monthly Labor Review* of the Department of Labor, special attention is called to the distinctions between the genuine and the so-called cooperative housing schemes, the Bureau having included only those societies which are genuine in their main particulars:

"Many apartments are being sold on the so-called cooperative plan by private builders who construct them, for sale, just as they do single houses, and sell them outright to individual buyers. The buyers are allowed to resell at a profit, as well as to rent their apartment or apartments for as large a rent as they can secure. Voting is on the basis of stock ownership, and one person may own several apartments and thus have a number of votes. This is not true of genuine cooperative societies, for in such societies each member has but one vote regardless of his capital holdings in the society. If any surplus is earned by the society, this is rebated, in the truly cooperative society, on the basis of patronage (i. e., the amount of the monthly payment) and not on stock held. The affairs of the society are managed by a board of directors of varying number, elected by the members. The actual management of the apartment house is quite often in the hands of one person chosen for the work.

"In the genuine cooperative society the tenant never receives a title to his dwelling. Legal ownership remains in the society as a whole. The member merely owns stock in the organization to the value of his apartment or dwelling and receives a permanent lease which he may pass on to his heirs. Should he desire to give up his membership, his stock must first be offered to the society, and if the latter is unable to redeem it at its par value he is allowed to sell it, at cost, to any person who he considers would be a desirable tenant. Transfers of stock must be made on the books of the society. In this way speculative profit by the members at the expense of the prospective member is prevented. It is not the purpose of cooperative building societies to enable tenants to obtain homes at bottom prices by building collectively and then to allow the individuals to own and sell them to others for profit. The purpose of cooperative building societies is to provide permanent homes for the people without private profit or speculation in land and buildings, collectively controlled and administered by the tenant members."



WRONG AND RIGHT WAYS OF TRIMMING ROADSIDE TREES

1. The top of this tree is bristling with stubs. The only thing that can be done now is to make two or three large cuts below these and to a healthy branch in order to remove them. 2. This once beautiful tree was bobbed off entirely to make room for the telephone wires. The trimming was done by a farm line concern that does not understand proper tree trimming. 3. Row of trees properly toptrimmed. 4. Proper flush cuts may be seen on this tree, which is undertrimmed

Telephone Company Makes Enviable Record in Trimming Roadside Trees

By H. L. Spooner

FIVE years ago the Michigan State Legislature passed a stringent law in regard to trimming and cutting roadside trees. Immediately on passage of the law, the Michigan Bell Telephone Company organized its forces to carry out this work, and a regular routine was established, from the securing of the permits to the completion of the work, including the disposal of the debris occasioned by cutting.

The law provides that written permits must be secured from the state highway commission for work on state roads; from the county road commission on county roads; from the township board on township roads; and from village or city councils on municipal roads. Verbal or written permission must also be secured from the abutting property owners. In the case of cutting down the trees entirely, the permits specify the number and species of trees and the name of the abutting property owner.

By means of electrical tests and patrols, the district office of the telephone company ascertains when a line is in need of trimming. An order for this trimming is made up and forwarded to the division office. Applications are then made to the proper authorities for permits. When the work begins, the permits from the property owners are secured by the foreman in charge of the work. In extreme cases, property owners are paid for their permission, while in others, if no amicable agreement is reached, high poles may be replaced with low ones, low poles with high ones, cross-arms or the short spacing of pins may be used, or the lead may be removed entirely.

The work is in charge of a trained forester attached to the division office.

The trimming gangs usually consist of three trimmers and a foreman. The size of the crew is often increased if the trimming is heavy. They are carefully selected and trained in scientific forestry.

No unnecessary cutting or trimming is per-

mitted. Trees are trimmed to preserve them and to retain their natural characteristics, while directing their growth away from properly located wires. Where low poles can be accommodated by undertrimming, the trees are trimmed high. Where undertrimming is not feasible, low heads are maintained or side trimming is done in such a way as not to mutilate the trees. When necessary to cut a main leader, it is cut at about a 45-degree angle just above a side branch strong enough to carry the growth. When branches are removed, they are cut off clean and flush with the main trunk or main branch. Under no circumstances are stubs left, for they are sure to die back, cause fungus disease, decay into the heart, and at last kill the tree. The wounds are covered with tar, asphaltum, or lead paint as a means of protection.

Trees which are eyesores, and especially those young trees which are directly under the lead and will be made unshapely by trimming later, are cut down with the permission of the property owner and new trees reset away from the lead. In the spring of 1925, fifteen poplars on the Mulliken school grounds were cut down and eight Norway maples planted in their stead. The poplars were directly under the wires, which were only 25 feet above the ground. These trees could never have been trimmed to look like trees, and the replacement saved money for the company in constant trimming and gained the favor of the community. The school received good, well-spaced trees for worthless, poorly spaced ones.

The Bell Company goes even farther than the state law requires. It cuts out dead branches or straggling ones that mar the beauty of the trees. It also cuts off unsightly stubs left in the trees from years gone by when ignorant workmen were allowed to do the trimming. It shapes up trees that are ungainly and does anything else needed to preserve the natural beauty of the trees.

When the trimming is finished, the débris must be removed and taken care of. If the abutting property owner can make use of any of the timber removed, the trimming gang must leave it for him in good shape to use. All waste branches must be cleaned up and burned in such a manner as not to injure other trees or private property.

Motor Vehicles in the Chicago Police Department

History of the Ford and Detective Bureau Squads

By Frederick Rex

Municipal Reference Librarian, City of Chicago

IN 1917, Ford cars were first used in the Chicago Police Department. Forty-two touring cars were purchased and distributed to the different districts. They were each manned by four men in citizens' dress. There was no mark of any kind on the car to show that it was a police car, except a gong. These cars were held at the district stations, and responded to all alarms.

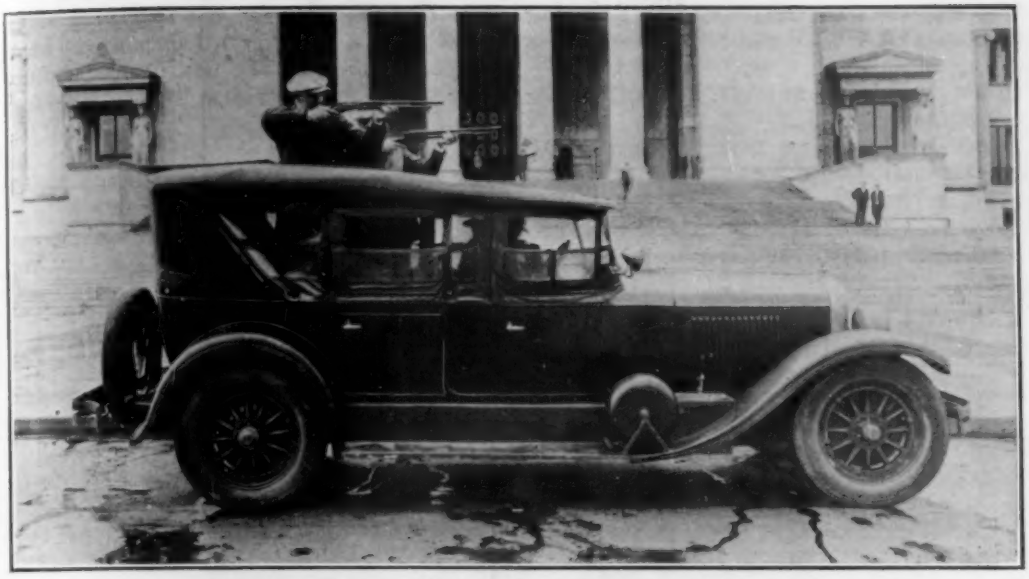
In 1921, fifty new touring cars were purchased and in 1923, fifty more. These cars were each manned by three men in uniform and toured the various districts, reporting to their district stations every half-hour.

In 1915, one hundred Ford roadsters were purchased. These cars were marked and lettered on sides and top, making them easily identified from upper windows as well as from sidewalk and street. They were equipped with electric lights and a gong, and cushion tires replaced pneumatic tires. These cars were manned by two men in uniform, trained in the care and driving of a Ford auto in the Police School.

The police Ford equipment and Ford school in Chicago are under the supervision of a Captain of Police, who has organized an efficient branch of service by selecting the men best qualified for this class of work.

Ford crews report over the police telephone every twenty minutes. The territory in large districts where few officers are available is now covered more thoroughly and frequently. The feeling of doubt as to a Ford's being suited to police work has been removed. The repeated requests from all commanding officers for additional cars in their respective districts prove the efficiency of this type of patrol service.

Seven Ford sedans and coupés are in use at the Detective Bureau and Auto Detail. The Auto Detail has one car equipped with an acetylene and oxygen unit complete, for immediate use in tracing changed or removed numbers on stolen autos. The Bureau of Identifica-

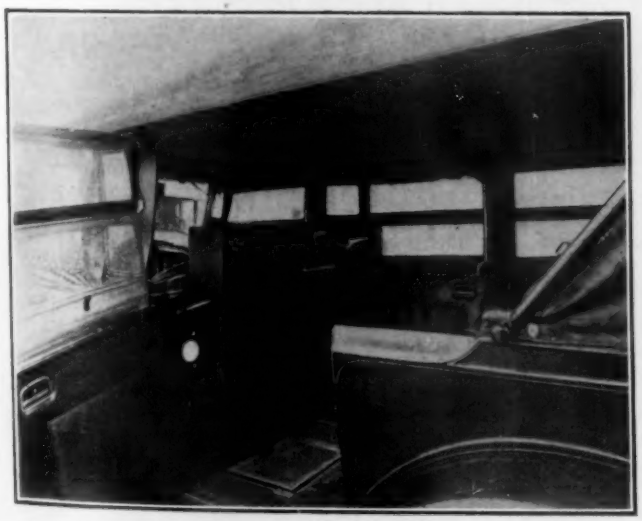


ONE OF THE HIGH-POWERED SQUAD CARS USED BY THE CHICAGO POLICE DEPARTMENT TO PATROL THE STREETS

The special top is open, showing the use that can be made of it in chasing criminals fleeing in automobiles

tion has a sedan to carry photographers and experts on finger prints, etc., to and from the scene of important crimes.

At the present time a request is before the City Council for forty touring cars and sixty roadsters, which will give the Department a total of two hundred and ten Fords. This will make an average of about six cars per district, and, with the squad cars from the Detective Bureau, the policing of the city of Chicago will compare favorably with that of any other city in the United States.



INTERIOR OF SQUAD CAR, WITH GUN RACK OPEN, SHOWING ILLUMINATING TORCHES AND OTHER EQUIPMENT

Increases in Number and Equipment of Detective Bureau Squad Cars

During the year 1920 there was one squad car assigned to the Detective Bureau, manned by five men who worked shifts of twelve hours as a tour of duty. Their only equipment was the regulation police revolver carried as prescribed for the individual police officer. The territory assigned was the entire city of Chicago. The number of men assigned to the Detective Bureau at this time totaled only 175.

During the years 1921 and 1922 five cars were added to the Detective Bureau, making a total of six, three to cover the south side of the city, and one each for the north, northwest, and west sides. A shotgun was added as equipment for each squad and the number of men increased to 200.

In December, 1923, seventeen zone squads were created and Wm. H. Schoemaker, appointed as temporary Captain of Police, placed in charge. Each of these zone squads was assigned to two police districts of the city and was provided with a shotgun as equipment. The number of men was increased to approximately 475. In the summer of 1924 three more squads were organized for zone work and one squad for taxi-

cab work and the man power brought up to 525 men. Each squad was provided with two regulation shotguns, a set of torches for illuminating purposes at night, and tear bombs and flash-lights.

On May 28, 1926, ten additional zone squads were organized, making a total of thirty squads and increasing the total number of men who were assigned to duty under the Detective Bureau to 675.

At present every car operated as a zone squad car is a high-powered Cadillac car kept in good condition. The city is divided into zones and a squad assigned to each zone for each eight hours of duty. The squad car is used by each of the three shifts. These squads are an important factor in the suppression and prevention of crime and give twenty-four hours' service and protection with a minimum investment.

Voting Machines Save Money and Encourage Voting in Iowa

Three Statements from County Auditors in Reply to Inquiry from THE AMERICAN CITY

Polk County, Iowa

From available records, the cost for using voting machines is eleven cents per vote, as against forty-six cents per vote at the last election in Polk County, where paper ballots were used.

This saving alone over a period of years soon reimburses a municipality for the actual cost of the machines; but to my mind, the outstanding recommendation is the simplicity of a ballot cast on the machine against the old-fashioned method of paper ballots where squares were to be marked and the intent of the voter was more or less at the mercy of the judges and clerks.

Another item is that of the speed with which returns of an election are made, as this office is always aware of the results of an election before midnight of the day of election. With the use of the paper ballot it was from three days to a week before this information was available.

It is my belief that a return of the paper ballot in this county would amount to the loss of fully sixty per cent of the vote, as I do not believe the voters here would again go back to the old cumbersome paper ballot method of voting.

J. G. COOK,
County Auditor.

Muscatine County, Iowa

Muscatine County, in 1923, purchased thirty-five voting machines of the latest type, from the Automatic Registering Machine Company of Jamestown, N. Y., for use in conducting elections in the county. This was done after a very careful investigation which covered a period of three years.

We have not used the machines long enough to know anything whatever about depreciation, as they are just as good as the day we received them. One of the first considerations to be met must, naturally, be the cost, to determine whether or not a saving can be made for the taxpayers. At this time, I am unable to give you an average, for the simple reason that the machines have not been in use long enough, but I will give you a comparison of the cost for the Presidential election in 1920 with the Australian ballots and the Presidential election in 1924 with the voting machines.

In 1920 we had 11,544 votes cast in the county, at a total cost of $5,156.76, making the cost between 44 cents and 45 cents per vote. In 1924 we had 11,917 votes cast in the county at a total cost of $1,571.80, making a cost of between 13 cents and 14 cents per vote. This, as you can readily see, is a decided saving effected by the voting machines.

A decided saving is made all through the line, from the printing of ballots, poll books and supplies, down through the cost of election officials. The following is a comparison of some of the items, to give you an idea as to where the savings are made:

	1920	1924
Judge	$585.60	$318.45
Clerk	406.80	90.30
Construction	106.50	47.00
Printing ballots	854.75	178.00
Poll books and supplies	2,099.67	397.45
Miscellaneous	248.90	169.10
Totals	$4,302.22	$1,200.30

Another important thing to consider, aside from the financial side, is the ease with which one can vote. I believe that this one thing was given weighty consideration by our Legislature when they enacted a law providing three minutes' time for a voter in the booth, voting an Australian ballot, and one minute while using a voting machine.

Since we have instructed the voters in the use of the machine, it is a very common thing for them to average four voters per minute—this, of course, during the rush periods. Another beauty is that, with the voting machine, it is impossible for voters to spoil their ballots. At the close of the polls there is no long-drawn-out session in counting ballots; neither is there any dispute as to the number of votes cast.

In Muscatine County it is the duty of the County Auditor to conduct elections, and I wish to say that, based on our experience with the Australian ballot and with the voting machines, I believe that I would sooner resign my position than go back to the Australian ballot, and certainly I would strenuously object to returning to the old "covered wagon" method of voting.

C. H. PITCHFORTH,
County Auditor

Scott County, Iowa

Voting machines were first used in Scott County at the general election held in November, 1920, and have been used at all elections held in this county since that time. These machines were purchased from the Automatic Registering Machine Company, of Jamestown, N. Y. The total number of voting machines owned by the county is 105, of which 15 were purchased recently to be used at the election to be held this fall.

The following is a statement of the cost of the general elections held in November, 1916 and 1918, when paper ballots were used:

Year	No. of Votes Cast	Total Cost	Cost per Vote
1916*	15,028	$4,267.15	$ .284
1918	11,782	4,519.01	.384

The following shows the cost of the general elections held in November, 1922 and 1924, when voting machines were used:

Year	No. of Votes Cast	Total Cost	Cost per Vote
1922	15,178	$3,188.78	$ .21
1924*	31,574	3,944.55	.125

*Presidential election years.

At the last election held in this county when paper ballots were used it was impossible in some precincts to get full election boards, owing to the fact that some persons did not desire to count ballots until the next morning or evening after election day for the sum of thirty cents per hour for such service, which is provided by statute. With voting machines, people are willing to serve on the election board for this compensation, because after the polls are closed it is only a matter of about two to five hours when the poll books have been properly filled out and turned over to the custodian of the election returns. Within three hours after the polls were closed at the presidential election held in November, 1924, the press in the city of Davenport had the complete returns from all the precincts in the county, whereas at the presidential election in 1916, when paper ballots were used, the returns from the last precinct were reported to the County Auditor's office two days after the election.

Another great advantage of the voting machine is that there are no spoiled ballots and the count is absolutely correct.

ALBERT O. KURTH,
County Auditor.

An Analysis of Bus Service by Electric Railways

"HOW Fares the Bus in Electric Railway Company?" was the title of a paper delivered by Walter Jackson, fare and bus consultant, Mt. Vernon, N. Y., before the Cleveland section of the Society of Automotive Engineers, October 4. The occasion served as a joint meeting of S. A. E. members and attendants at the convention of the American Electric Railway Association.

The speaker stated that while some three hundred electric railways were using busses, most of the installations were so recent that only a score or two had experience figures available. He then analyzed twenty-eight cases covering every variety of service, from small town to inter-city and large city conditions. While the supplementary and development nature of the services could hardly lead to making such routes self-sustaining, quite a number of these railways had suffered much greater losses than expected. Among the reasons for this were: the "fatal flexibility" of the bus, which led to more new routes than even the monopoly obligations of the railway justified; pressure of bus propaganda which interpreted "rubber urge" in terms of public bus rather than in terms of private car; over-selling of busses by manufacturers; higher operating costs for busses than figured in manufacturers' estimates.

Mr. Jackson said that the addition of busses in large cities and replacement of cars by busses in small cities should be guided by sound transportation analysis and not by bus salesmen. The greatest opportunity of the automotive public transport vehicle did not lie in trying to supplant via bus the electric railway where there was any worth-while traffic, but in developing a limousine service on short headways and fares like 25 cents to exploit the desire for comfort and speed generated by private cars, but free of the annoyances of parking and personal driving.

Roadside Planting Best Done by Community Effort

SUITABLE tree planting along public highways, which greatly enhances their appearance and comfort, is most satisfactorily done by the community as a whole rather than by individuals, says the United States Department of Agriculture in its new bulletin, "Planting the Roadside." Interest in country highways in the United States has increased rapidly during the last few years. The greater interest in rural roads is due largely to the growing automobile traffic, a large part of which is pleasure driving in which the most beautiful routes are naturally sought. Few states, however, have good laws providing for such planting.

The traveling public has as much interest in the appearance of the road as a whole as has the adjoining property holder. Furthermore, it is usually difficult to get each property holder to approve and act on a given plan. For these reasons, says the Department of Agriculture, it is best to place the planting and subsequent care of roadside trees in the hands of a public body representing one such division as the state, county, town, township, or parish, rather than smaller units.

Because of the intimate relationship between road construction and maintenance and the upkeep of the roadside, the closest cooperation between the highway department and those having the trees in charge is needed.

Suggestions relative to planning for the trees, planting and spacing them, the kinds of plants, pruning, arrangement of shrubs and perennials, and other phases of the work are given.

A copy of the new publication (Farmers Bulletin 1481-F) may be obtained free from the U. S. Department of Agriculture, Washington, D. C.

Methods and Costs of Street Cleaning in Kansas City, Mo.—Part II

From a Report by the Kansas City Public Service Institute

Costs of Street Cleaning

BELOW is a table of the expenditures for the Division of Street Cleaning for the past sixteen years and the budget for 1926. These figures do not include the cost of water used:

STREET-CLEANING EXPENDITURES

	Salaries and Wages	Other Expense	Total Expended	Cost per Capita
1910	$223,149	*$14,704	$237,853	0.98
1911	219,191	*18,186	237,377	0.95
1912	189,479	*22,459	211,938	0.82
1913	186,433	*22,053	208,486	0.79
1914	188,246	*20,592	208,838	0.76
1915	198,603	*21,898	220,501	0.78
1916	178,067	38,970	217,037	0.75
1917	168,546	48,207	216,753	0.73
1918	175,825	36,300	212,125	0.70
1919	187,071	33,936	221,007	0.70
1920	236,016	29,076	265,092	0.82
1921	281,334	19,763	301,097	0.89
1922	314,528	28,478	343,006	0.98
1923	271,592	11,067	283,019	0.80
1924	230,080	21,943	252,023	0.71
1925	232,888	31,907	264,795	0.71
1926 Budget	225,000	25,000	250,000	0.66

*Does not include office and miscellaneous expense. Unpaid bills not included in any year except 1925.

Comparative Costs for One Week Analyzed

The discussion of unit costs by the three methods for the week of May 8-15, inclusive, 1926, is given below. It was necessary to take the comparison of the total cost for certain items for the past three years. These cost figures are not absolutely accurate. In order to obtain them, it was necessary to calculate from the daily reports the number of square yards cleaned. It was also necessary to make some arbitrary assumptions in determining the distribution of other than labor costs. Overhead costs are not included. For the purpose of showing the relative cost of the various methods of cleaning used, however, the unit costs arrived at are sufficiently accurate.

Flushing Costs.—The total cost of flushing includes the cost of labor, water, gas, oil, repairs to flusher, interest, and depreciation. Depreciation was figured on a five-year basis, and interest at 6 per cent on the original investment depreciated in five years. The cost found in Kansas City, 10.4 cents per 1,000 square yards, is comparable with that found in other cities. The cost in other cities, as shown in the table prepared from the questionnaire of the St. Louis Bureau of Municipal Research, is 4.4 to 37 cents:

Quantities Cleaned in Week

Number of blocks cleaned	2828
Total length of streets cleaned in miles	211
Number of square yards cleaned	4,760,000

Cost for Week	Total Cost	Cost in Cents per 1000 Sq. Yds.
Salary and wages, 4 chauffeurs, 4 laborers	$216.00	4.5
Water, 182,000 cubic feet	109.44	2.3
Operation of machine (gasoline, oil and repairs)	95.31	2.0
Interest and depreciation	75.00	1.6
Total	$495.75	10.4

The foregoing figures do not include the cost of supervision.

Hand Sweeping Costs.—The total cost under hand sweeping includes labor, repairs to push-cart, the cost of operating one truck to pick up the sweepings, and the cost of water used in flushing gutters. The cost of 45.7 cents per 1,000 square yards, when compared with the costs found in other cities, is about average. These vary from as low as 15 cents to 75 cents per 1,000 square yards:

Quantities Cleaned in Week

Number of blocks cleaned	2,610
Total length of streets in miles	176
Number of square yards	4,456,000

Cost for Week	Total Cost	Cost in Cents per 1000 Sq. Yards
Foremen's salaries (2)	$62.40	1.4
Labor	1,206.00	27.0
Water—1,096,200 cubic feet	660.00	14.7
Misc. expense, interest and depreciation	35.10	0.8
Gasoline, oil and repairs for pick-up truck	40.80	0.9
Brooms and repairs	40.26	9.9
Total	$2,044.56	45.7

The foregoing figures do not include the cost of supervision.

Cart Cleaning Costs.—Total costs shown for cart cleaning include the cost of labor, cost of hay and grain, veterinary services, horseshoeing and repairs, interest and repairs, and the cost of water used in flushing gutters. For the purpose of figuring interest and depreciation, a value of $7,500 for 32 horses and $2,000 for 32 carts and harness was used. Depreciation was figured on a basis of ten years, and interest at 6 per cent. The cost of 72.8 cents per 1,000 square yards for cleaning by this method cannot be compared to that in any other city, for the reason that in no other city was this method of cleaning found to be used:

Quantities Cleaned in Week

Number of blocks cleaned	3,259
Total length of streets cleaned in miles	235
Number of square yards cleaned	4,714,000

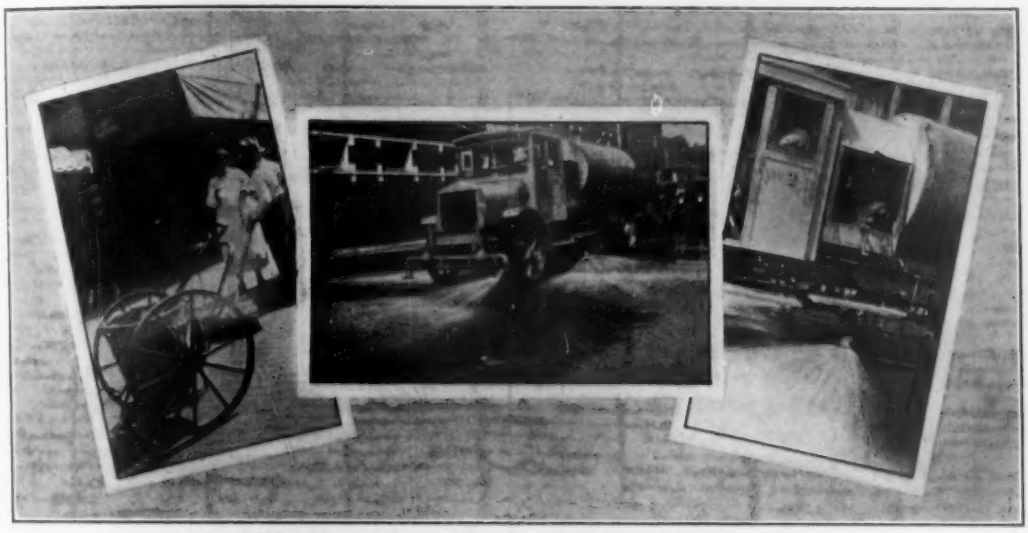
Cost for Week	Total Cost	Cost in Cents per 1000 Sq. Yards
Foremen's salaries (13)	$405.60	8.6
Labor—39 laborers, 29 cartmen, 7 barnmen, 1 blacksmith and repairman	1,965.00	41.6
Water, 1,260,000 cubic feet	756.00	16.0
Hay and grain	105.00	2.2
Repairs	170.94	3.6
Interest and depreciation	36.48	0.8
Total	$3,439.02	72.8

The foregoing figures do not include the cost of supervision.

A summary of the three methods as taken from the week of May 8-15 by reference to the previous tables, shows a total of 13,930,000 square yards cleaned; 34 per cent of this was cleaned by flushing, at a cost of $495.75, or 10.4 cents per 1,000 square yards; 32 per cent was cleaned by hand at a cost of $2,044.56, or 45.7 cents per 1,000 square yards; and 34 per cent was cleaned by use of horse-drawn carts at a cost of $3,439.02, or 72.8 cents per 1,000 square yards. The 34 per cent cleaned by flushing and the 32 per cent cleaned by hand represent an area of approximately 1,000,000 square yards, which was cleaned several times. The total cost for this week's cleaning was $5,979. Of this sum, $4,307 was actual outlay, the balance being the computed cost of water, interest, and depreciation.

Cost of Cleaning by Methods Not Used in Kansas City

Costs given by other cities for different methods of street cleaning, and including interest and depreciation, are given below. The cost of cleaning by the use of a pick-up sweeper, including the expense of disposing of the sweepings, was about 25 cents per 1,000 square yards, varying from as low as 13 cents per 1,000 square yards to as high as 41 cents per 1,000 square yards, depending upon the smoothness of the pavement, the topography, and the system of management. Los Angeles reported the cost of auto pick-up sweeping as 14.5 cents; Buffalo, 30.8 cents; Chicago, 26.5 cents; and Rockford, Ill., 41 cents, per 1,000 square yards. These figures included interest and depreciation and the cost of supervision. The cost of cleaning by vacuum sweeping is from 19 cents to 79 cents, the average being about 30 cents.



STREET-CLEANING METHODS USED IN KANSAS CITY

At left.—Hand patrol by hand sweeping with pushcart. Center and right.—Power flushing of hard-surfaced streets

The cost of cleaning by horse-drawn brooms or sweepers is about 20 cents per 1,000 square yards, but this form of cleaning is not generally used.

Effects of Condition of Streets

The materials of construction used on Kansas City streets, with the percentage of each type, are bituminous macadam, 15 per cent; sheet and rock asphalt, 41 per cent; concrete, 30 per cent; brick or block with bituminous grouting, 14 per cent. The location of macadam streets is generally in outlying districts where the least street dirt is produced. The principal downtown streets are either asphalt or concrete with some block paving.

Flushing is particularly effective on asphalt surfaces when they are in anything like fair condition of repair. Asphalt is also cleaned

effectively by pick-up sweepers because of the smoothness of the surface. Concrete streets are effectively flushed and machine-swept, although the roughness of the surface is more wearing on brooms than asphalt is. Brick or block pavements may be effectively flushed if laid with some bituminous material other than sand. This kind of pavement, although not especially hard on brooms, is not usually swept by machine sweepers, because the broom has a tendency to pull out the joint material between blocks. Wood and brick pavements should probably be flushed, provided they are not laid with sand. Concrete and asphalt may be cleaned either by brushes or by pick-up sweepers, with preference for flushing where possible on concrete. Macadam should be flushed, because machine sweeping will eventually remove the surface material, and considerable wear is experienced on brooms.

The effectiveness of flushing depends in a great measure on street grades. A sloping street can easily be flushed clean, whereas a street without any grade will be more difficult. Flushing will put considerable dirt into the sewers and catch-basins if a sufficient amount of water is used and if the street has a sufficient grade. Unless the sewers are too small, it is desirable to flush to the sewer, but if an insufficient quantity of water is used, the débris will not reach the sewer but will stop at the catch-basin, thereby making necessary the cleaning of the catch-basin.

The street grades in Kansas City are practically all sufficient for satisfactory flushing. The sewers, however, are not all of sufficient size to permit flushing to them. All downtown sewers and a large percentage of outlying sewers are large enough to permit flushing street dirt into them. In some sections there are no storm sewers or catch-basins.

Streets whose surfaces are full of holes are not effectively cleaned by any metnod, but proper investigation as to the particular condition of each street will reveal which, if any, method can be used. It has been said that on account of the poor repair of so many Kansas City streets, flushing cannot be extended to any district other than those where it is now used. Some of the streets in poorest condition have been flushed. This should not be done: first, because dirt and débris are washed into these holes and soon after becoming dry begin to blow about, littering the street again; and second, because continually filling these holes with water hastens the deterioration of the pavement.

Determination of which streets should be flushed requires a detailed study of each street and conditions found after flushing, including the amount of dirt left in the catch-basins and gutters and flushed to the sewers, and the cleanliness of the street before and after flushing. This information is not particularly difficult to obtain.

A still further impediment to flushing is the dodging of automobiles. This is particularly disadvantageous, since a large percentage of street dirt is along the curb. The only remedy for the parking difficulty is to flush during that part of the day when parking is least, as is now done in Kansas City. Parking does not completely stop flushing, for the water will go under a parked car, but the effectiveness is considerably lessened. Downtown streets during the day and especially betwen 8 A. M. and 5 P. M. can hardly be flushed, but from midnight until morning they are practically free from parked cars. On residential streets, on the other hand, there is less parking during the middle of the day, so there is a time when most streets may be flushed without too much interference from parked automobiles. Flushing is most effective during wet weather, since the dirt on the pavement is soaked loose. Wet weather is thus an aid rather than a hindrance to flushing.

The effectiveness of pick-up sweeping depends a great deal upon the surface of the street. Smooth surfaces are swept effectively, while on pavements with surfaces full of holes this method of cleaning is less satisfactory. The brooms will sweep dirt out of small holes or depressions but will only fill up holes of considerable depth. There is no damage done to the street surface, nor is there any dirt swept to the gutter, catch-basins or sewer. These sweepers are equipped with a rotating, vertically inclined broom which cleans the gutter effectively. The only effect of the grade upon this type of cleaning is the additional gasoline required.

Parked automobiles are the chief handicap to the auto sweeper. The effectiveness of the machine is dependent upon being able to sweep that portion of the street next to the curb, and the portion of the street under a parked car cannot be reached in this manner. If a car is parked along the curb, the only thing that can be done is to drive around it, thus leaving an area uncleaned. An arrangement can be worked out, as in the case of the flusher, whereby sweeping can be done when parking is at a minimum.

Wet streets are effectively swept clean as in the case of flushing. This machine carries a

tank of water for sprinkling streets directly in front of the sweeper, to keep down dust in dry weather.

When used under proper conditions, the vacuum sweeper is one of the most effective means of cleaning. This machine has the same disadvantages that the pick-up sweeper has, and has the additional one of not being able to operate effectively during wet weather. The vacuum sweeper is probably one of the most effective on smooth surfaces upon which there is a considerable amount of loose, dry dirt. It will remove fine material that neither a pick-up sweeper nor a flusher can remove. When the surface is wet, this fine dust clings to the surface and will not be lifted by a vacuum. This type of machine is equipped with a rotary broom which will remove the larger material even in wet weather, but its chief advantage is lost when it rains.

The cost of cleaning streets by cart patrol is 72.8 cents per 1,000 square yards, these streets being cleaned on the average of once every two weeks. As shown above, this cleaning could be done either by flushing, which costs 10.4 cents per 1,000 square yards, or by auto pick-up sweepers, at about 30 cents per 1,000 square yards. Thus, there is a possible saving which would make it worth a great deal of time and effort to determine the particular method or combination of methods most adaptable to Kansas City streets.

Suggestions

The report upon which this article is based has been submitted to the Director of Public Works and the Commissioner of Street Cleaning, who are in agreement with the Kansas City Public Service Institute that the unit cost of cleaning in other than business streets is too high and can be reduced. They have agreed to conduct an experiment in one or more districts to determine the relative efficiency and costs by various methods. The result of this experiment will serve as a guide in determining the type of cleaning to be used through the residential districts.

The Institute has suggested that plans be made to abandon the cart patrol system so far as possible, and as quickly as new methods can be substituted; and that the city be redivided into districts better adapted to the various methods of cleaning; that the organization be modified to conform to the new methods; that a complete cost record and reporting system be installed; that the most effective method of operating the present flushers be determined by actual study and continued by careful supervision; that cart patrol cleaners and opening of hydrants by hand be abandoned as rapidly as possible; and that adequate inspection of building construction, etc., be provided in order that provisions of ordinances and regulations to prevent unnecessary littering of streets may be enforced.

Chicago Increases Lighting Intensity on State Street

STATE Street, one of the main business thoroughfares of Chicago, will be one of the world's brightest white ways when its new lighting units are installed. There will be approximately 1,800 lumens per lineal foot of street, more than 100 per cent more than the most intensive street-lighting system installed up to the present time. Seventy specially designed ornamental Union Metal standards are to be placed in the Loop District. Two fixtures equipped with 2,000-watt lamps will be mounted on each standard, with the light center nearly 28 feet above the sidewalk. The standards, which are to be arranged on both sides of the street and opposite each other, will be placed approximately 100 feet apart.

The system, operating on a 110-volt direct-current three-wire system, will be remote-controlled from a central point with a number of magnetic contactors located along the system. In most instances there is a contactor for each pole, but in some locations one controls two or three poles. The contactors are connected to a three-wire control system operating from the 220-volt side. All three wires are positive, each contactor being connected to the negative side of the Edison three-wire system.

All the lamps will operate until one o'clock. At that time some of them will be turned off, the others remaining lighted through the night. Alternate standards will remain lighted so that a balanced effect will be maintained.

Conduit Sterilized Before Water Is Turned On

THE 72-inch steel water-main which is now being used to increase the water pressure in the northern section of the borough of Queens, New York City, was first given a real old-fashioned scrubbing with soap powder and water, following which it was sterilized with chlorine to prevent any possible contamination of the water by any foreign substance in the pipes. Repeated samples were taken until the results showed that the conduit was in a perfectly sterile condition.

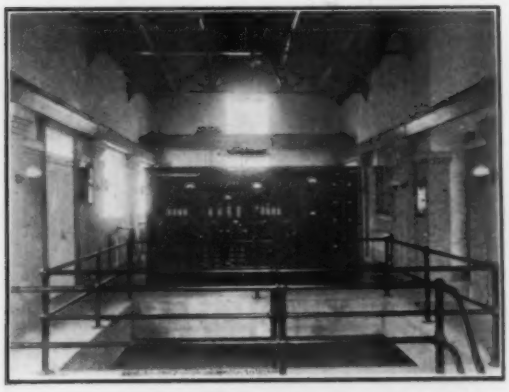
This new Williamsburg conduit is a part of the new water system running from Fort Greene Park, Brooklyn, to Long Island City. It is reducing the draft on the 48-inch Queens conduit, which formerly was the only one operating in Queens. It has increased the pressure at least 10 pounds in northern Queens.

The Sewage Treatment Plant at New Rochelle, N. Y.

Features of Electrical Equipment for Screens and Pumps

A NEW sewage treatment and disposal plant just completed for the city of New Rochelle, N. Y., from the designs of Fuller & McClintock, consulting engineers, New York, by the Tuller Construction Company, is capable of handling a maximum of 20,000,000 gallons of sewage per day, although the plant is a comparatively small one, as will be seen by the illustration opposite. The plant is electrically operated and involves an interesting arrangement of motors and controls. In the case of a flood or very severe sewage conditions, the sewage can be by-passed into the bay direct. The sewage enters the plant through a hydraulically operated valve near which is a bar screen that takes out very large pieces of waste matter. The sewage then passes through either or both of two hand-operated gates into Dorr cylindrical screens which take out a large percentage of the solids and allow the water to flow into a large sump. The solids are elevated by a compressed-air ejector which blows them into another building, whence they are hauled away to be used as fertilizer. The screened sewage in the sump is treated with liquid chlorine and then is pumped into the bay.

The centrifugal pumps used to pump the sewage from the sump are governed by a special General Electric control panel. There are two pumps, each driven by a 40-horsepower G. E. slip-ring motor. The arrangement is such that either motor may be operated manually or automatically, separately or simultaneously. The



ELECTRIC SWITCHBOARD, NEW ROCHELLE SEWAGE WORKS

EXTERIOR OF THE NEW ROCHELLE, N. Y., SEWAGE DISPOSAL PLANT

panel controlling the operation is automatically energized by means of five float switches, each one set at a different water-level. When it is desired to operate automatically, either or both of the switches controlling the two motors are thrown to the automatic position.

The sequence of automatic operation is as follows: When the first float switch closes, the motors automatically accelerate to 80 per cent of full load speed, and the sewage will be pumped at the minimum rate from the sump into the discharge lines to the bay. Should the water in the sump rise faster than it is being pumped out, the second float switch will operate, bringing the pump motor to 85 per cent of full load speed. This continues as the water rises, each of the remaining float switches being actuated at its corresponding water-levels, increasing the pump motor speed to 90, 95, and 100 per cent of full load.

The operation is reversed as the water-level falls, the motors automatically slowing down as the water reaches each float switch level.

At each speed of the motors, a bull's-eye lamp is lit, indicating to the operator the speed at which the motor is running. When operating by hand, the control is first thrown to the manual position, and as soon as the "start" tumbler switch is closed, the panel automatically brings the motor to the 80 per cent speed. The other speeds are obtained by throwing a number of tumbler switches mounted on the board. By adopting this method of speed control, the engineers found it possible to use a smaller motor and a smaller discharge pipe than would be required if the pumps were operating at a 100 per cent speed only.

Origin and Growth of Public Water-Supply*—Part I

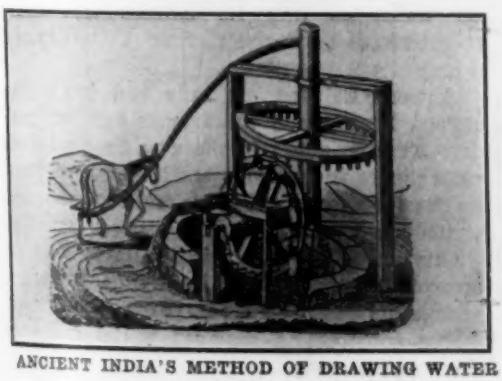
By Perry Hopkins

IN early ages man's struggle was for the right to live—mere existence. Gradually, as things became easier through the fruits of man's ingenuity and from accumulated experience, he found ways to obtain a few comforts, which in course of time have become conveniences that are looked upon as necessities. But it was many centuries before man's progress was able to get concerted action among his neighbors toward providing those comforts for the general enjoyment of the community. Even when the way was found to build public works, the tribal ruler or other chief was the only person having power to commandeer necessary labor; and, wherever possible, this was a compulsory contribution of vassals or slaves by the leaders of less powerful tribes or clans.

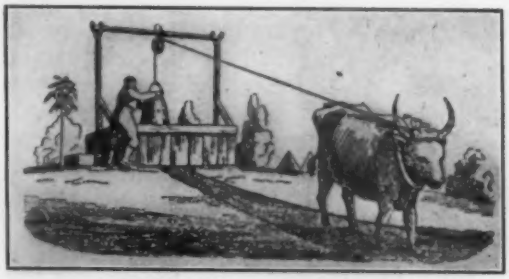
Water-supply was one of the earliest objects of kingly attention, especially for the protection of cities that were likely to be besieged. Supplies from wells and springs were early discovered to be more dependable than from running streams whose supply might fail at some critical time, since it was the smaller streams that were usually first used as sources of water.

After a while, man learned to scoop out a space surrounding a spring, so that the accumulated water could supply several persons who came to the spring about the same time. Enlargement of the scooped-out basins into wells was a further step. Then the brink of the well was protected by stones, to prevent muddying the water where the earth broke away under the users' feet. Lining the whole well with stone came afterward. Then man seemed to be satisfied for a while with his accomplishment. Indeed, some isolated communities which lack thrift or energy have gone no further, even to this day, in spite of readily available means of financing such projects, and assured returns in higher property values.

* Copyright by Perry Hopkins, 1926. All rights reserved.



ANCIENT INDIA'S METHOD OF DRAWING WATER



JOSEPH'S WELL, CAIRO, EGYPT

The First Sales of Water

Peddling water from the wells was a natural growth of man's trading instinct, and the caravans and nomads were found willing to exchange their goods for water and for the food that was to be found near a good water-supply. In this way, the well-owner's barterings brought him the nucleus of a local trading center—from which the crossroads store of later times developed. Ownership of the well property made the nearby land desirable, and immigrants selected their new homes for nearness to arable land, just as today the newcomer chooses land where a water-supply of assured sanitary and chemical qualities is available.

If there was a stream nearby which could float the traders' craft, then the well-owner was able to profit from water-travel as well as land-travel; and the seaport grew up into a city—because commerce is scarcely more than local bartering upon a large scale.

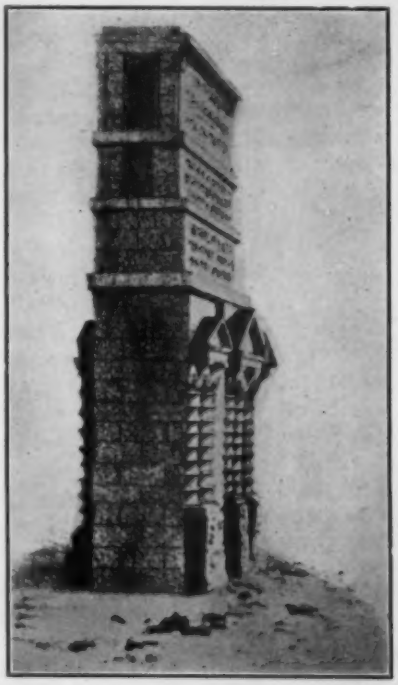
Ancient Pipes and Pumps

It was necessary to watch the water carefully, and the frequent risings of the watcher to fill the ewers or water-skins of the "customers" became irksome. Just as laziness has been the source of so many other inventions, so it seems probable that some lazy well-owner

contrived to avoid the manual work of dipping up the water, by inventing a hollow reed or pipe that would conduct the supply for some little distance down the hillside. His example would be followed by other owners of hillside wells, and the owners of level-ground wells met the competition by rigging crude windmills that operated even ruder pumps which would raise the well-water into a butt or tank, from which a section of bamboo or other tube would carry it to the caller's vessel, while the owner contentedly squatted—and took the customer's money. The raised tank became the reservoir of later centuries, whence the supply could be delivered to some distance by gravity.

Water-peddlers who distributed a daily supply, as we do of milk, found steady business among the outlying places where wells or springs were absent. This was the first "service charge" by a public utility.

But winds are proverbially fickle, and the water-venders found their supply exhausted when the wind didn't blow. So the lazy well-owner thought out the treadmill and the crude set of buckets which later became the power water-wheel. Then he hired or coerced somebody to work the treadmill while he continued to squat contentedly, with a long whip within reach to "stimulate" the footsore wretch when he tired of the drudgery. The treadmill as a means of water-supply is still in use in some oriental countries, principally in irrigating nearby lands. But the ingenuity of man in other places has converted it into the endless-chain-bucket scheme. All modern bucket elevators trace back to this water-bucket conception.



SECTION OF A DOUBLE ROMAN AQUEDUCT

The life of a good well is almost limitless. Near the Egyptian pyramids are wells that have been in use ever since those famous structures were built. Joseph's Well at Cairo shows that in those distant days there was good engineering skill. This well is cut in solid rock, and consists of two stories or "lifts." The 18 x 24-foot upper shaft is 165 feet deep, and there is also a lower shaft 9 x 15 feet, which is cut to a further depth of 130 feet, or a total depth of 295 feet. Endless chains carry the buckets in series.

But Egypt is not the only place where early engineering skill is apparent. In China, wells up to 1,500 feet in depth have been dug by methods that are almost identical with modern procedure.

Service Reservoirs

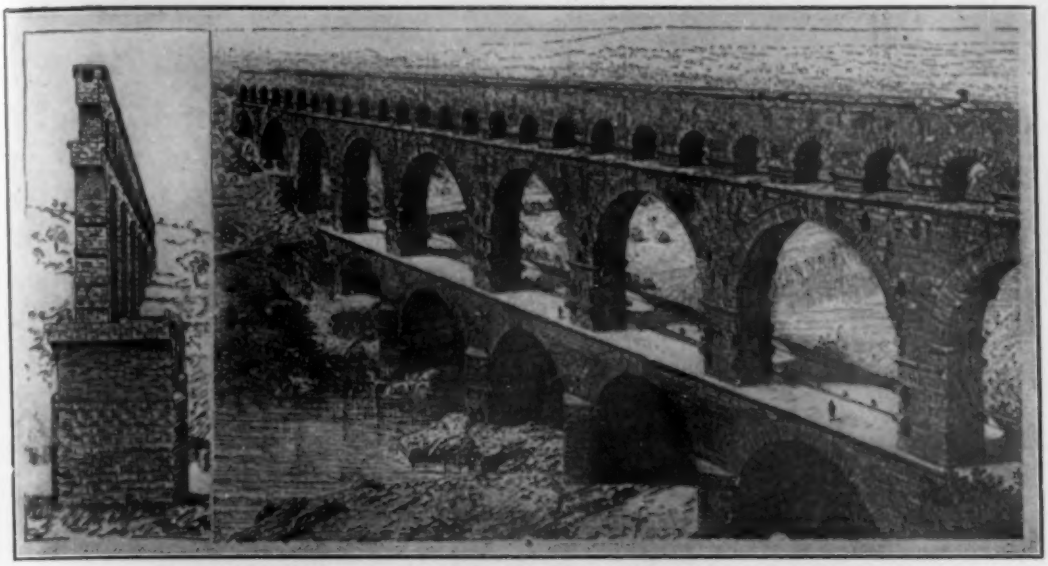
The next important development in distributing water was the service reservoir, into which a large volume could be pumped for withdrawal as needed. These storage basins, also, are of ancient origin. Underground cisterns were built in Jerusalem to store rain-water where evaporation would be slower than on the surface of the earth. Another set of cisterns were used to store the water that was brought into Jerusalem through masonry conduits.

Greek aqueducts that were mentioned by Herodotus are still in a good state of preservation, and some of them contain inverted siphons that were made and fitted from cut-stone blocks. These siphons made it possible to draw water over intervening obstructions and even hills, thus saving much labor in pumping.

To describe the many other ingenious and extensive water-works of early times would unduly prolong this article. Ancient Carthage, for example, is believed to have had an extensive system of underground reservoirs, as well as great cisterns within its walls, so that its citizens and army might have water sufficient to withstand a long siege.

Ancient Babylon not only had its water-supply, from which the famous hanging gardens were irrigated, by the way, but had terra cotta piping for conduits and a system of manholes whose preserved relics and replicas show virtually no difference from modern practice.

One irrigation reservoir in Egypt had an area of 30,000 acres, and in Madras, India, investigators have found 50,000 reservoirs, whose construction required 30,000 miles of earth embankment.

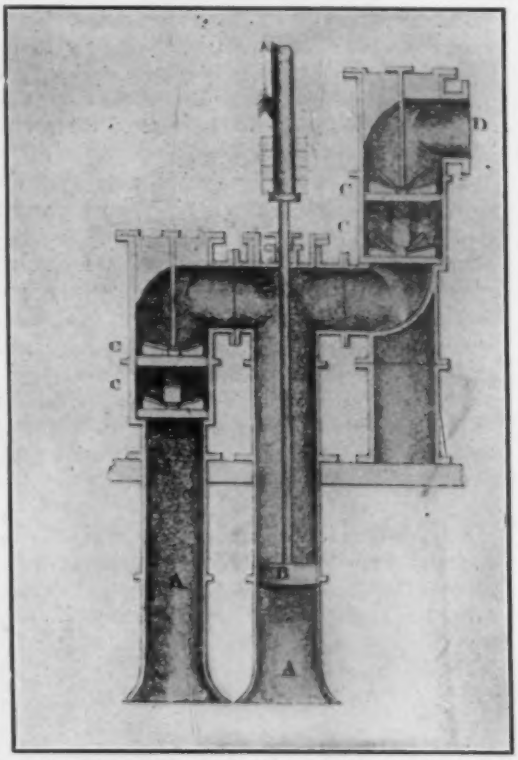


THE AQUA APPIA AQUEDUCT IN ROME WITH SECTION SHOWING CONDUIT FOR WATER AT TOP AND ROADWAY BELOW ON MAIN ARCHES

The Roman Aqueducts

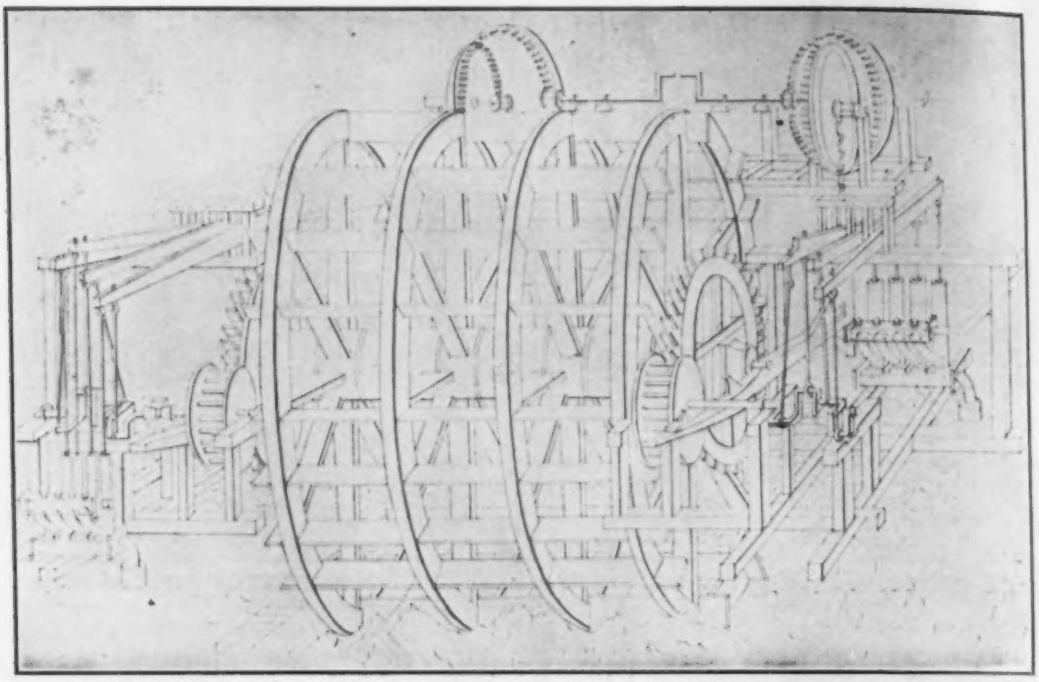
No ancient city was better supplied with water than Rome. Before the year 312 B.C., water-supply was obtained from the river Tiber and from various springs and wells. As the city's population increased, and pollution of such water sources became aggravated, it was decided to bring in a further supply from more distant sources. When the system was completed, fourteen separate aqueducts, totaling 359 miles in length, brought water for a distance of 50 miles. Before this could be accomplished, hills had to be tunneled and huge waterways had to be carried across valleys upon trestles of masonry arches, which remain to this day sources of wonder and inspiration. As we have no mention of Rome's use of gunpowder to blast out the stone of the tunnels, we must assume that the work was done by heating the stone and then dashing water upon it so that the resultant steam would rend the necessary openings. The Romans carried their engineering skill to other places. At Lyons, France, they constructed water-works in which 9 miles of lead pipe have been found, that varied from 12 to 18 inches in diameter and worked under a 200-foot head. They also built water-works at Metz, Germany, and at Seville, Spain. Half of the former system still remains in use, although originally built in the year A. D. 130.

Speaking generally, water distribution in the early days was not markedly different from our own methods, excepting that at first the water passed from the aqueducts into large cisterns and from these was carried (in Rome, for example) through lead pipes to the foun-



SECTION OF THE FIRST LIFTING AND FORCING PUMP EMPLOYED AT THE LONDON WATER-WORKS

AA, cylinders; B, piston; CCCC, valves; and D, discharge pipe



WATER-WHEEL OPERATING PUMPS AT THE FIRST LONDON BRIDGE WATER-WORKS

tains, baths, and other public buildings. Up to that stage of civilization, water-supply to individual homes was unthought of and only a few of the nobles' or other leaders' palaces were reached directly. The rest of the people had to get their supply from the nearest public fountain. It is interesting to note that the estimated daily supply of Roman water amounted to about 50 gallons per capita—which ancient consumption figure is somewhat remarkable, because modern American per capita figures where the water-supply is metered show 35 to 75 gallons for various cities, and an average of 50 seems quite reasonable in view of the general differences of the habits of those days. History indicates that among the middle and upper classes the Romans were cleaner physically than morally during the nation's latter days.

As showing early attention to hygiene, the Romans were well aware of the dangers of lead-poisoning and recommended that water from lead pipes should be boiled and filtered, iron pipes being unknown at that time. In some cases, artificial reservoirs were built to purify the water-supply by sedimentation.

Development Retarded

The fall of Rome brought about great damage to the aqueducts, whose destruction was a natural objective of the enemy, but the Roman Church dignitaries managed to maintain better water-supply after Rome's fall than most other cities of that period enjoyed.

The ravages of pestilence in the Middle Ages were unquestionably due in great measure to use of polluted drinking water and to infrequent bathing. Even in Shakespeare's day, theater audiences that became stifled in the ill-ventilated and overcrowded pit used to demand the burning of pungent juniper to offset the fetid and germ-laden air of those cramped quarters.

Until near the close of the 16th century, no real improvement seems to have been made in developing public sanitation measures, and between Roman times and the modern renaissance of hygienic measures, little seems to have been done in water-works development. A notable exception, however, was the re-conditioning by the Moors, at Cordova, Spain, of the water-works that had been built by the Romans in the 9th century.

European Supplies in Eleventh to Fifteenth Centuries

As late as the year 1183, Paris depended for its water-supply upon the River Seine, and even when a small aqueduct furnished a negligible quart a day per capita 400 years later, the city was ill-supplied.

In London, as early as 1235, small quantities of spring water were brought into the old city by means of lead pipes. This was only 20

years after the signing of Magna Charta. In 1582, or 350 years later, a pump was installed on London Bridge to distribute the public supply.

About the middle of the 16th century, in Mexico, a Franciscan monk fostered construction of an aqueduct nearly 30 miles long, and having three arched bridges 125 feet high. But in general, water-works development in America was very slow until the second half of the 19th century. At the close of 1800 there were only 17 water-works in the United States. By 1825 the number had doubled, and in 1850 it reached 100. In 1875 there were 243. The 1,000 mark was reached in 1885, and by 1895 there were 3,000. In one 10-year period more than 1,300 water-works were built.

Since then, besides the steady increase in such developments, greater attention has been paid to the quality of the water.

(To be continued in the January issue of THE AMERICAN CITY)

$4,000,000 Community Welfare Building Proposed for New York

TO house all of the city's social service organizations, under one roof, the erection of a $4,000,000 "Community Welfare Building" is proposed by the Executive Committee of the Welfare Council of New York.

The present United Charities Building, which was adequate to the city's needs when it was built 36 years ago, now provides space for only 35 of the 1,500 welfare agencies of the city. At the present time, according to tabulations presented by the Committee, 178 of these organizations occupy 343,000 square feet of rented space, for which they pay an average rental of $1.80 per square foot. Some pay rentals as high as $3 a square foot.

In a recent statement, William Hodson, Executive Director of the Welfare Council, is quoted as saying:

"The value of central officing for social agencies is now being recognized in other cities, such as Philadelphia, Cincinnati, Detroit, Boston and Minneapolis.

"The time has come to erect in New York a Community Welfare Building large enough to meet the present need. The building should have not less than 300,000 square feet and should be capable of considerable expansion beyond that point if future needs require. It must rent for not more than $1.50 per square foot. It should provide a large auditorium and numerous small committee rooms. There should be ample vaults for storage and special service rooms of various types. Library, restaurant, and club rooms are also suggested.

"Architecturally, the building should be a structure of beauty and dignity, as befit the uses to which it is devoted. The lobby will afford an opportunity to pay tribute to those citizens of New York whose contribution to social welfare and humanitarian betterment have been particularly important.

"A suitable site for the building can be found at a cost of about $1,000,000, on which the necessary building can be erected at a cost of about $3,000,000. It is proposed to meet about one-half the total cost by means of a first mortgage, and the remainder mainly by large gifts from public-spirited citizens and supporters of social work."

"Ask the Recreation Department"

(Abstract of an Address before the National Recreation Congress at Atlantic City, October 19, by Jay B. Nash, Formerly Superintendent of Recreation, Oakland, Calif., and Now Assistant Professor of Physical Education, School of Education, New York University)

"ASK the Recreation Department" should be as familiarly phrased in every city as is the phrase, "Ask Mr. Foster" in many railroad stations.

The Recreation Department should be the Service Bureau of the city. It should literally say to the residents and the vistors, "Ask me anything."

Specifically, it should say, "If you want to engage in any sport—tennis, golf, baseball, or what not; if you want to join a team; if you want to give a picnic; *'Ask the Recreation Department.'*"

It should say, "If you want to give a dance or an evening party, or a picnic in the hills, *'Ask the Recreation Department'* for a place.

"If you want to know how to arrange a backyard playground, or build a tennis court, *'Ask the Recreation Department.'*"

It should say to the Sunday Schools, churches, civic and fraternal organizations: "If you want to have a play day, give a picnic, or plan any type of sports, *'Ask the Recreation Department.'*"

It should say to the industries, "If you want to plan a recreation activity for your members or arrange a baseball schedule, or lay out a playground, *'Ask the Recreation Department.'*"

It should say to conventions, "If you want an afternoon of play, *'Ask the Recreation Department.'*"

It should be axiomatic both for citizens and for strangers within the gate. If they want to participate in play or recreation, they should "Ask the Recreation Department."

If the Department is less than this, it is less than it should be.

Interdependence of Zoning and Park Planning*

By Myron H. West
President, American Park Builders, Chicago

FROM a practical standpoint, the park system and its individual units must be placed where they belong, for a misplaced park is as bad as a misplaced city hall, fire-station or schoolhouse. It is obvious, therefore, that before a comprehensive park system can be fitted into the city's structure there must first of all be prepared and adopted a comprehensive zoning plan which will reach out far beyond those invisible and constantly changing barriers called the city limits into a region which, ten, twenty or fifty years from now, will in turn be a part of the city. Such a zoning plan must of course be the objective of the immediate zoning plan by which areas for business, industry, and housing are properly segregated. Many things must be borne in mind, of course, in designing such an arrangement of uses, not the least of which are prevailing winds, character of terrain, source of water-supply, location of shipping, railroads, industries, mines, etc.

Parks and Playgrounds in Relation to Factories, Homes and Schools

Park units placed in the factory zone should be especially designed for the crowds of workmen who will swarm upon them during the luncheon hour. Parkways leading to outlying forest preserves should not be carried through the factory district unless unavoidable. Neighborhood parks should be placed near enough together in residential districts to be within easy walking distance of the remotest home. New school sites should be placed elsewhere than on business streets and main thoroughfares, and neighborhood playgrounds supplementing the school yard and containing the swimming pool, gymnasium, ball field, tennis courts, etc., should be placed to serve contiguous zones of proper size. A balanced arrangement should exist, not only relative to playgrounds and neighborhood parks, but to outlying forest preserves. The parkway system, or boulevard system, as it is sometimes inappropriately called, if adopted at all, should be planned in such a way as to interfere as little as possible with the every-day city traffic. While it is a sensible procedure to provide for avenues of fast-moving light traffic into and out of the city, it must not be forgotten that the truck, coal wagon, and grocery car are things of every-day need and must be given their thoroughfare.

The street tree system of the city most assuredly comes under the park program, not only because it is essentially a park feature, but because the park department is or should be prepared to give proper control and maintenance.

The rapid growth of our cities and the danger to pedestrians brought about by motor traffic make it necessary to minimize or to eliminate altogether driveways through our smaller parks. Where these are necessary, drives should be wide, should have long sweeping curves to give visibility, and should go over or under walks. As a rule, however, ample parking space for cars should be provided and driveways dispensed with.

Architectural and Landscape Features

Conservatories, zoological gardens, flower gardens, outdoor gymnasiums, park buildings, bridges, and other architectural features should be most carefully handled with the idea of general composition and policy of use kept paramount. The part should not dominate the whole.

The landscape architect, trained in the science of arranging land for human use—which includes cities, as it does golf courses and cemeteries, parks and polo fields—must be familiar with his materials, whether these be trees or trafficways, railroads or radio stations, but the real test of his success as measured by his work must hinge upon his ability to place these features upon the face of the earth in a workmanlike manner and in the right position and relationship, so that a harmonious composition will be produced, tested not only by the rules of art but by the satisfaction and comfort of the greatest number of people.

* From a paper on "Park Design" presented at the Fourth Annual Conference on City Planning held under the joint direction of the Engineering Extension Department, Purdue University, and the Indiana City Planning Association, at Terre Haute, Ind., September 28-30, 1926. Mr. West's complete paper, in mimeographed form, can be secured by addressing the Engineering Extension Department of Purdue University, Lafayette, Ind.

The Oakland-Alameda Estuary Tube

A New Departure in Traffic Tunnel Construction

By N. D. Baker
Office Engineer

A GIANT subway tube of pre-cast concrete, in diameter the largest in the world, and in design one of the most difficult and interesting engineering problems ever undertaken, has reached an important stage of construction on the estuary between Oakland and Alameda, on San Francisco Bay, California.

Including two portal buildings and two open approaches with retaining walls, measuring altogether 933 feet, and with twelve pre-cast concrete cylindrical sections built in a large marine dry dock at Hunter's Point, San Francisco, the tube has a total length of 4,476 feet from surface to surface, a maximum grade of 4.59 per cent, and an outside diameter of 37 feet, with walls 2½ feet thick. It is the largest subaqueous tunnel ever designed and undertaken, although not the longest. The Rotherhithe tunnel under the Thames River in England is next largest, with 30 feet outside diameter, and the Holland Tunnel under the Hudson River next, with 29 feet, 6 inches. Both of these tunnels were driven by the shield and compressed-air method.

The Oakland-Alameda tube is the only underwriter traffic tunnel ever built in pre-cast segments of concrete. The method was considered for the Holland Tunnel and for the Detroit River tunnel, but abandoned because no satisfactory method of joining the segments had been devised. The difficulty of maintaining an open trench in the soft silt of the Hudson River bed also was a factor in that case.

THE OAKLAND PORTAL BUILDING SUBWAY ENTRANCE

Looking toward the estuary. Open approach with retaining walls in foreground. Portal building housing ventilating equipment and contractors' concrete plant shown in the right foreground

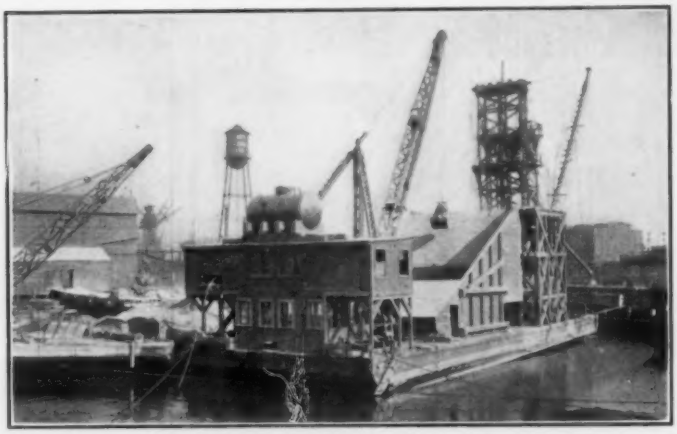
The Oakland tube is being built by Alameda County (which includes in its boundaries both Oakland and Alameda), in response to an order of the United States War Department, and is backed by a $4,496,000 bond issue. Replacing the present Webster Street bridge, the tube will accommodate two-way street-car tracks and motor traffic on a single 24-foot roadway, and pedestrian traffic on two 3½-foot sidewalks raised slightly above the level of the road slab on each side of it. It constitutes the main artery of travel between two cities in the third largest community on the Pacific Coast, the so-called East Bay section.

READY TO POUR THE ROAD SLAB

The inside of the Alameda portal building, showing the reinforcing steel as laid and the tremie seal ready to receive the concrete floor slab base

History of the Tube

Agitation favoring construction of a tube under the estuary has been under way since 1912. The War Department, having jurisdiction over rivers and harbors, in 1916 declared the Webster Street traffic bridge and the Harrison Street bridge of the Southern Pacific Railroad, both



TREMIE CONCRETE BARGE
From this plant all the tremie work on the Alameda cofferdam and most of the walls for the Alameda portal building were poured

of the swing type, a menace to deep-water navigation and an obstruction to the development of the Oakland harbor. Their removal and replacement by bridges of the bascule or direct lift type, or by a subway under the estuary, was ordered.

Because of the entrance of the United States into the World War in 1917, action was deferred until 1921, when the Federal Government renewed its order. At that time, those interested in the development of the harbor exerted pressure in favor of the tube. As a result, the aforementiond bond issue was voted by residents of the county, test borings were made with a churn drill to a depth of 116 feet, and the preparation of plans and specifications for the project was placed under the direction of County Surveyor George A. Posey as Chief Engineer. He selected his chief assistants, and a board of consulting engineers was appointed, including the late Clifford M. Holland, for whom the Holland Tunnel is named; Professor William H. Burr, Dean of Civil Engineering at Columbia University; and Professor Charles Derleth, Jr., Dean of Civil Engineering at the University of California. Harry E. Squire was named chief advisory engineer.

About eighteen months' time was spent in the preparation of plans, and bids were received March 23, 1925. The contract was awarded on a low bid to the California Bridge and Tunnel Company for $3,882,958, with a clause which called for completion of the tube in 900 working days. Excavation was started on the Oakland side of the estuary June 15, 1925.

The Present Stage of Construction

At the present stage of construction, the portal buildings on both sides have been completed except for the inside finishing and the installation of ventilating fans; the portion of the tube built in open cut on the Oakland side is practically finished; approaches are complete except for paving, and nearly half the tube sections have been finished in dry dock, bulkheaded, floated across eight miles of bay water, and sunk in place on grade piers. These were driven to grade from a barge with a McKiernan-Terry 11-B double-acting underwater steam hammer.

It is confidently expected that the tube will be opened to traffic by the first of 1928.

Construction has progressed in three units, each separate and distinct, and each with its own problems and construction methods. One crew of men is working on the Oakland side of the estuary, putting finishing touches on a 1,555-foot portion of the tube built in open cut; another set is at work on the Alameda side, and a 24-hour shift is rushing to completion the last batch of pre-cast sections at Hunter's Point.

On the Oakland side, work is being handled by a subcontractor for the California Bridge & Tunnel Company, the Robinson-Roberts Company, of Los Angeles and Oakland. This portion of the job involved digging a cut 80 feet wide with a Marion ¾-yard steam shovel and a P. & H. clamshell excavator into sand strata and hard blue clay to a maximum of 72 feet below street grade and 60 to 70 feet below mean tide level in the estuary; also construction of a 635-foot cofferdam of heavy timbers and Lackawanna interlocking sheet steel piling. The longest piles were 55 feet. Steam shovel excavation, allowing the banks to slope 1 to 1, was first made to a depth of 25 feet; then the piling was driven to 5 feet below subgrade, most of it with a McKiernan-Terry 11-B steam hammer, the tops being approximately 20 feet below street level.

The Drainage Device

Although this work was carried on far below tide level and not far from the estuary, there was comparatively little water on the job. This was owing to the contractor's plan of digging a series of drainage sumps on the center line of the job, keeping always about 200 feet ahead of excavation and bleeding the ground almost dry before working it. These

sumps, 6 to 8 feet square, were occupied continually with double-runner vertical pumps made by the Union Iron Works of Oakland. A 10-horse electric motor was found sufficient to care for the maximum 65-foot lift.

At the lower end of the cut, toward the estuary, the ground was very heavy, consisting of strata of earth-fill on top of blue mud, beneath which was a water-bearing sand, and beneath that again a tough blue clay. Sullivan air spades were used to penetrate this stiff material. The cofferdam was pumped out with 2-inch centrifugal pumps, and when the tube had been completed, waterproofed with Johns-Manville waterproofing membrane and primer, and bricked over on top of this, the sheet piling in the cofferdam was removed, using 26-inch blocks and a 10 x 12 Barber steam hoist. The P. & H. excavator worked itself into the cut, mounted with its crawler treads on construction timbers, loading excavated material into a hopper over trucking ways at the side of the ditch, on the street level, as the work neared completion.

A 20-ton stiff-leg derrick with an 80-foot boom and an American three-drum hoist, 8¼ by 10, was used in laying the complicated timber system, which consisted of 12 by 20 wale pieces, 12 by 12 struts, both doubled, and 4-foot oak corbel blocks. The sections were rodded, with trusses in each tier. The cut passes under two sets of railroad tracks, the Southern Pacific and the Western Pacific main lines. The tracks were not removed, but girder spans were inserted under them, and traffic continued uninterrupted.

The Oakland Concrete Plant

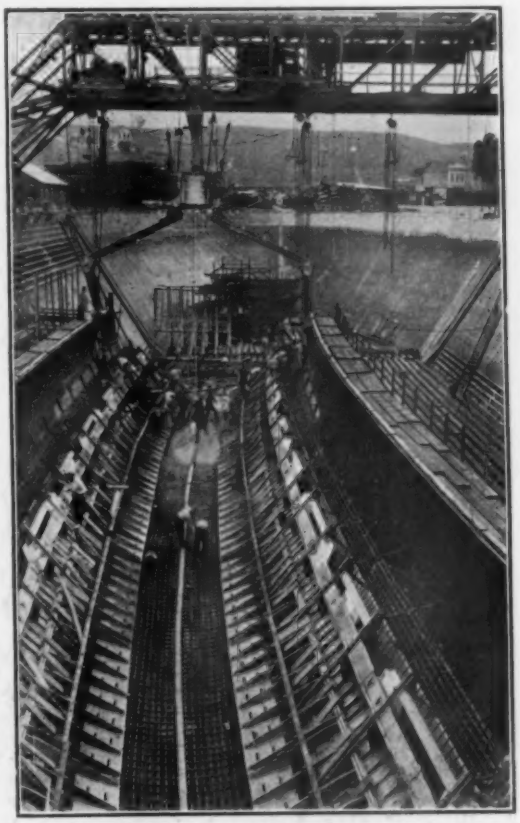
Concrete work was done from a central mixing plant with a Lakewood mixer and Blaw-Knox measuring hoppers and storage bins. Specifications for the portion of the tube built in open cut are the same as for the pre-cast sections except for 87 feet of transition section adjoining the Oakland portal building. This is square, partly in order to provide for the ventilating system, which has four ducts here, one at each corner. As the transition section joins the tube, the ducts are brought together at top and bottom. The cylindrical section is reinforced concrete, poured in place, using wooden forms. The method of pouring is similar to that used in pouring the square portion and the portal buildings.

The subcontract calls for completion of the built-in-place portion of the tube to within approximately 500 feet of the banks of the estuary. At this point it will be bulkheaded and the remainder of the distance dredged out to permit the last two sections to be floated in and joined to the completed Oakland tube.

On the Alameda side of the estuary, construction of the cofferdam for the portal building proved a very complicated and difficult job. The methods devised are unique and the work proved of unusual interest, second only in actual significance to the building of pre-cast segments in dry dock.

The Alameda Portal Cofferdam

As is usual in most cofferdams, the first designs submitted by the contractor's engineer called for a wood sheet-pile cofferdam supported by struts spaced at about 4-foot centers from bottom to top, and 10-foot centers horizontally. The mass of timbers which this called for met with little favor. Lochiel M. King, construction engineer, working with county officials, suggested a type of cofferdam to consist of a braced crib at the top, using 16-by 16-inch O. P. sheet piling and leaving a clear open space 23 feet in height above the



PLACING REINFORCING STEEL

Showing one of the invert sections in dry dock and forms for the roadway slab in place. This is one of the curved sections of the tube

tremie seal.

The Alameda portal building is 90 feet by 71 feet 6 inches in plan, with a bottom 36 feet below high tide. This called for a cofferdam 80 by 100 feet and an excavation 42 feet below high tide, made with two big suction dredges owned by the American Dredging Company, of San Francisco. Working with a 5-yard clamshell dredge owned by the same firm, these were alternately engaged in digging a 2,400-foot channel from the Alameda portal building across the estuary. The 5-yard clamshell is now completing this trench below the 40-foot level.

To support the portal building, or rather to hold it down, because its displacement is more than equal to its weight during construction, 525 wood piles averaging 60 feet in length were driven to hardpan by a McKiernan-Terry No. 9-B double-acting steam underwater hammer mounted on a barge which carried a Lidgerwood steam engine and boiler. Three feet of broken rock was dumped in around the piles to prevent the mud from mixing with the tremie concrete in the base seal, and the piles were driven with the hammer to within 3 feet above the broken rock.

A steel diaphragm weighing 30 tons was built and designed to set down over the projecting piles to hold the bottom tremie seal. This carried 290 dowels, 1 inch in diameter, bent at the top and projecting above the concrete, to be built into the structural floor slab. A powerful derrick barge was hired from the Haviside Company, of San Francisco, having a capacity of 150 tons at the bow and 100 tons at the beam, to lift this diaphragm and set it in place. It was found that it did not fit down over the projecting piles, and it had to be taken apart and set down in sections. Divers assisted in this work, operating from a barge equipped with a ¾ by 4 Type E, Fairbanks-Morse compressor.

Pouring the Tremie Seal

The bottom was tremie sealed with 5 feet of concrete, under 35 feet of water, in one continuous pour from a 50- by 120-foot tremie barge equipped with a Mundy hoisting engine and a 3-drum tower hoist, and carrying two Leach-Oshkosh 1-yard mixers, size 28-S, and Blaw-Knox adjustable measuring batchers. The concrete mix for the tremie pours was seven sacks of Old Mission portland cement to the yard of aggregate, and samples taken by divers from the bottom during the pour developed a strength of more than 3,000 pounds in 21 days. The unwatering of the cofferdam began nineteen days after the seal was poured, and was completed in three days with a 6-inch Byron-Jackson pump and a 12-inch pump of the same make. The bottom proved to be perfectly tight, and a few small leaks in the sheet piling were easily stopped with calking and sawdust.

The braced crib at the top of the cofferdam was of course set in place before the sheet piling was closed. It consisted of eight heavy trusses in one direction crossed by six trusses in the other direction, and was built on a floating barge at the construction wharf a short distance from the site of the portal building. Its purpose of course was to carry the water load while the walls were being poured.

The trusses in the crib are 14 feet deep and act as struts, supporting the walling, which in turn supports the sheet piling. The crib measured 80 by 100 feet in plan, to fit the cofferdam, and weighed 220 tons. A problem arose about the method to be used in getting it off the barge so that it could be floated into place, and an ingenious solution finally was adopted. The barge carrying the crib was floated into dry dock at the Moore Ship Yards about a mile away and tied to the floor of the dry dock with steel eye-bars. Then the dock was flooded and the frame floated off and towed to position. Here it was sunk in position by loading it with sacks of sand to the proper depth.

With the bottom chords of this trussed crib 23 feet above the tremie seal, there was no interference in the building of forms and placing of steel for the lower walls, roadway and mezzanine floor in the portal building, all of reinforced concrete with six sacks of cement per cubic yard. The end collar, which will be sealed to the first section of the tube proper, was poured at the same time, and bulkheaded before removal of the cofferdam, just as it will be on the Oakland side.

In process of construction on the Alameda side, it was necessary to reroute several hundred feet of Webster Street, including streetcar tracks, and to tear up some paving. Several buildings also were removed, including an old hotel.

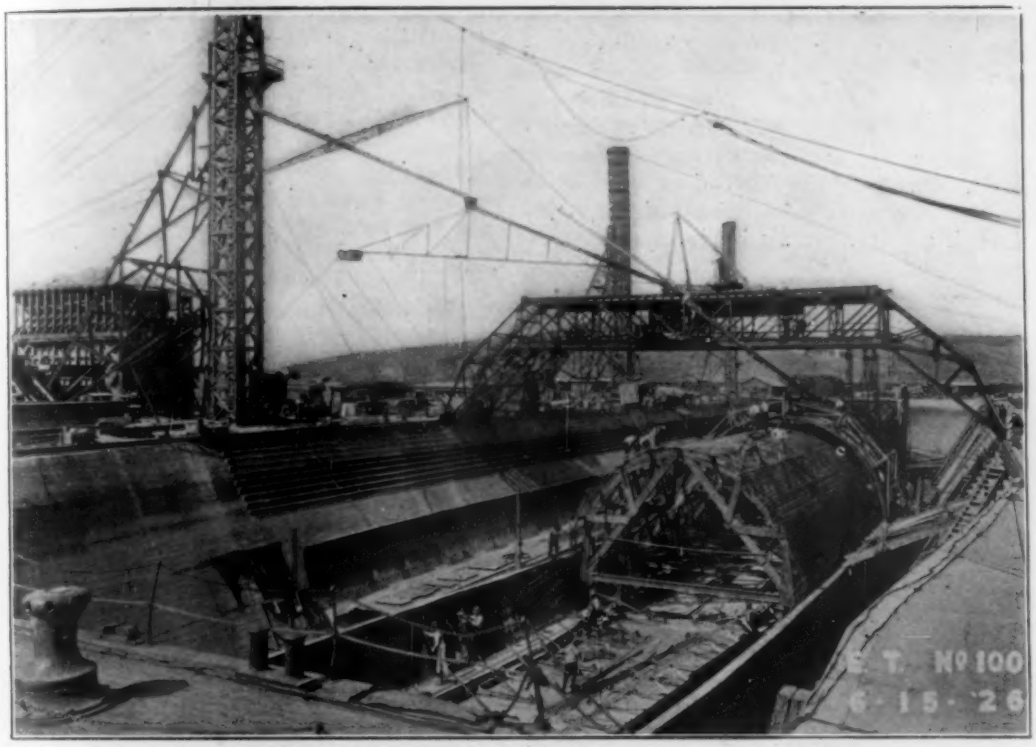
Building the Segments

No part of the tube work caused more general interest than the construction of the twelve pre-cast segments, each 203 feet long and weighing when complete about 4,600 tons each. They are fairly comparable in bulk to an ordinary-sized concrete ship, although they float

much lower. Built in dry dock at Hunter's Point, San Francisco, as has been stated, they are being bulkheaded as fast as they are completed, floated out three at a time, and towed across eight miles of San Francisco Bay behind tugboats.

In profile, the completed tube has a grade of 4.5 per cent on the Alameda side and 4.59 per cent on the Oakland side, and reaches in the center of the estuary a depth of 67.7 feet from low-water level to the roadway crown.

The contractor's construction plant at Hunter's Point is a large one, representing an investment of $200,000 for equipment installed in dry dock especially for this job. The twelve sections require 30,000 cubic yards of concrete. Aggregates are brought to the site, about six miles south of San Francisco on the bay shore, on barges. An American-Terry 75-foot stiff-leg derrick using a 1½-yard clamshell bucket unloads these barges into small delivery bunkers. From here the material is elevated on a



DRY DOCK AT HUNTER'S POINT, WHERE SEGMENTS WERE CAST

Workmen are placing reinforcing steel for the arch section of the nearest tube segment. The invert portions and road slabs are poured and at the opposite end the collar and outside form are seen. Straddling the dry dock is a big gantry traveler for heavy work, and on the opposite side are the Insley towers, one of the concrete plants, chutes and cableways

This will give a minimum clearance of 40 feet between mean low water and the top of the structure between government pier-head lines, thus permitting development of the inner harbor to that depth.

In plan, the tube has three curved sections, already sunk on the Alameda side, to provide for the lateral aberration between Harrison Street on the Oakland side, and the Alameda center line on Webster Street. This curve has a lateral radius of 1,273 feet. Two of the sections also are slightly curved at the ends in profile, to insure tight joints where the grades meet at maximum depth. The rest are straight.

belt conveyor to storage bins of 1,500-yard capacity. Old Mission portland cement is trucked in from the nearest rail point. In pouring the tube sections, an 8-sack mix is used. After segregation into stock piles, the aggregates are lifted into bunkers over the concrete mixing plant by means of a Northwest crawler crane.

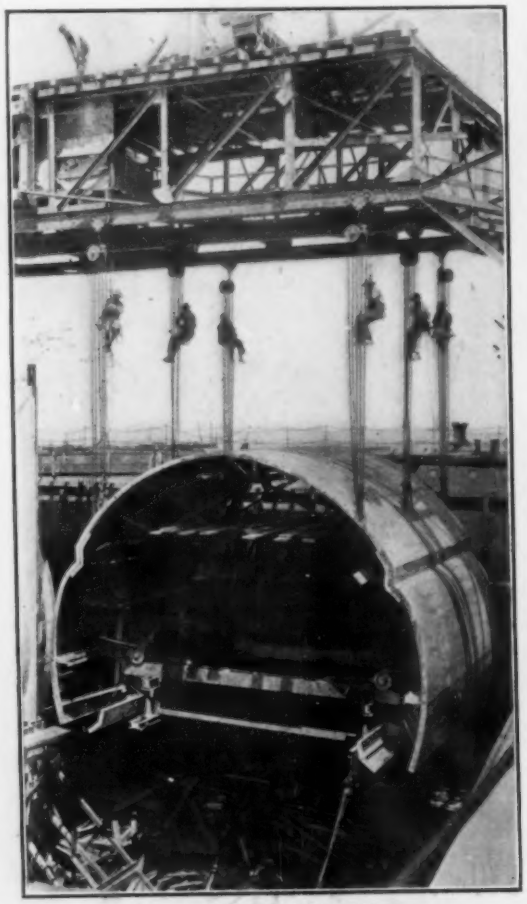
The Concrete Plant

The mixing plant consists of two Lynch-Oshkosh mixers, each with a capacity of 45 cubic feet dry and 28 cubic feet wet, and Blaw-Knox batchers. Trains of Muller and Koppel cars

hauled by two Whitcomb gasoline locomotives on narrow-gage rails, convey the concrete from the mixers to three Insley towers perched on the edge of the dry dock, each 112 feet above the ground surface. From here it is chuted to the sections as needed, using Insley flexible chutes and Roebling cables.

An Ohio steam locomotive crane is used for general utility and for unloading lumber, much of which is in heavy timbers. Two Northwest cranes and one P. & H. caterpillar crane also are used.

For handling the heavy timbers and steel forms and for other heavy work, a gantry traveler was built. This straddles the dry dock on rails 121 feet apart. It has a capacity of 20 tons at any panel point, and is moved laterally by a Pacific Hoist & Derrick Company outfit. On top of the gantry is a small crane operated by a National hoist, and suspended from it are 10-ton chain blocks.



RIDING THE FORMS

This Blaw-Knox inside form is being set by men on the chains, who guide it as the traveler moves it into position

The forms of steel for pouring the concrete sections were built at the Blaw-Knox Company plant in Pittsburgh, Pa. The outside forms for the invert, or the lower half of the sections, which contains the road slab, are made of curved angle-steel, braced, and 2- by 12-inch planks 21 feet long. With the outside invert forms set and rigidly braced against the sides of the dry dock and the timber frames previously prepared for them, the inside of the form is covered with waterproof membrane consisting of three plies of open-mesh cotton fabric mopped with hot asphalt, half Petrolastic and half Grade C. With the reinforcing steel in position and the inside Blaw-Knox steel forms set, the full length of the invert up to the level of the road slab is made in one continuous pour from the concrete chutes.

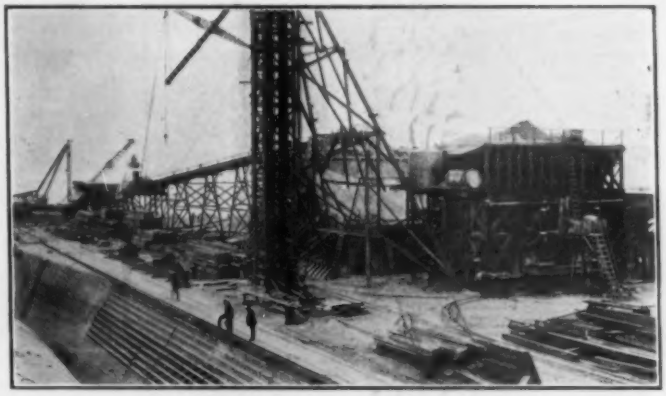
The road slabs are built next, employing traveling forms in two sections, each about 100 feet long.

The Arch Sections

The arch sections are necessarily the most difficult of construction. They, too, are built in sections, these measuring 101½ feet, two to a segment. A special form for the reinforcing steel is rolled onto the floor slab and adjusted to the proper height with jack-screws, and the reinforcing steel for 101½ feet of arch section placed in position. As the form for the steel is moved along to cover the next 101½ feet, another big arch form is rolled into the position vacated by the first on a second set of travelers. While the outside form is being placed over the steel, this inside Blaw-Knox form is jacked into position, laterally and vertically, being built with hinged joints. The outside arch forms are somewhat similar to the invert forms, built in 21-foot sections with inspection doors provided about 6 feet apart vertically and horizontally. The unusual amount of reinforcing steel and stirrups, 232 tons in each 203-foot segment, made the job of pouring a dense concrete almost impossible. On the first form, the outside was hammered while pouring was in progress, but the resulting concrete was not satisfactory, so in later designs the stirrups were increased in size and spaced farther apart. Now it is possible for men with tamps to get between the walls while the arch is being poured, and there has been no further trouble with the concrete.

Three feet from the ends of each segment a square collar is cast. In the vertical faces of these are set half embedded interlocking sheet steel piles. When the two segments are brought together under water as they are laid

in the trench, the collar surfaces are thus 6 feet apart. This provides a secure and unprecedented method of joining the segments under water. As the two collars are brought together, a half-cylinder of 3-foot radius, with mate sections of sheet pile attached to the edges, is slipped onto the two piles and sunk to the mud line. This leaves the bottom and top free, and a 6-foot space between the collars, into which the tremie concrete is poured to complete the seal. The bulkheads are then knocked out and the inside of the joint, already provided with lapped reinforcement, concreted and grouted.



CONCRETE MIXING PLANT
Base of one of the Insley towers, two mixers and conveyor

Sinking the Barrels

The bulkheads must withstand a total pressure of 3,600,000 pounds. They are built up of 24-inch I-beams covered by 6- and 8-inch timber, thoroughly waterproofed with cotton fabric and asphalt. The portion below the roadway slab, however, is bulkheaded with concrete.

To sink the tubes it is necessary to let water only into the portion below the road slab. Between 800 and 900 tons of sand placed on top of the road slab makes them thoroughly manageable. The tubes are sunk on grade piers built in the dry through steel caissons but their foundation is a bed of sand fill, flushed under the segment as it is held at grade. This sand rests directly on hard blue clay at the bottom of the trench, except for a portion about 400 feet long at the Alameda portal building, where piles have been set for a foundation, as silt was encountered.

Ventilation

Much time was spent on designs for ventilation. For most of the length of the subway, the inner diameter is a 32-foot circle. The roadway ceiling at the top and the road slab at the bottom cut off large segments above and below. Actually, about one-third of the inside cross-section area is used for ventilation space. Below the roadway is the fresh-air duct through which a constant supply is forced at high pressure from big fans in the portal buildings. This air enters the tube through openings to a continuous expansion chamber just over the roadway curbs and under the sidewalk, from which delivery of fresh air is made uniform throughout the tube.

Exhaust gases are drawn off through frequent openings in the roadway ceiling into the space above, from which they are pulled by suction fans to the portal buildings and discharged. Each portal building has its own exhaust and pressure fans, and each takes care of half the total length of the tube, down to mid-channel.

Traffic Through the Tube

When the tube is opened to traffic, the old Webster Street bridge will be torn down. On January 7 last, the freighter Lancaster rammed this bridge and toppled the 340-foot swing span into the channel, completely blocking navigation and forcing all communication between Alameda and Oakland to be routed several miles out of the way. The new tube will eliminate all such possibilities of disaster, and will handle a large amount of traffic. During one week of July, 1925, a traffic census was taken covering 7 consecutive days, 24 hours a day. The total number of motor-driven vehicles passing through was from 10,000 to 12,000 a day and 15,000 on Sunday, in addition to about 40 street cars in a maximum hour.

The number of ships passing through the Webster Street drawbridge has constantly increased. During 1925 there were more than 25,000 ships passing through, an average of more than 80 for each week day. Actual reports of bridge openings in the same period showed an average of 44 per week-day, a total loss in time to passing traffic of three hours and 40 minutes per day.

Unit costs on tube construction have not been computed, but during the month of August, 1926, work was progressing at an average of about $10,000 worth a day. An average total of 350 to 400 men are employed on the job. At Hunter's Point, they work on a 24-hour day,

DRIVING PILES THROUGH CAISSONS

A McKiernan-Terry steam hammer is shown driving piles for a foundation for the first two segments of the tube in front of the Alameda portal building. The rest of the segments rest on a sand fill spread over blue clay at the bottom of the trench

three-shift basis, and at the other two construction points three-shift days have been maintained at various times.

Alternate bids were prepared at the county's request on a type of tube similar to the one under the Detroit River, consisting of a steel shell poured full of tremie concrete. It is estimated that approximately $2,000,000 has been saved by doing the job in pre-cast segments.

Construction Personnel

Most of the contracting and engineering personnel has been mentioned already. For convenience they may be grouped together:

Main contract for construction of sections, dredging, laying the tube and for the Alameda portal and approach, California Bridge & Tunnel Company, San Francisco; subcontract for work on the Oakland side, including approach, portal and built-in-place section of the tube, Robinson-Roberts Company, Los Angeles and Oakland; reinforcing steel, Badt-Falk Company, San Francisco.

George A. Posey, Chief Engineer, is County Surveyor for Alameda County, California. On his engineering staff are Austin W. Earl, designing engineer; Lochiel M. King, specification and construction engineer, and the writer as office engineer.

The board of consulting engineers includes the late Clifford M. Holland, William H. Burr, Charles Derleth, Jr., and as chief advisory engineer, Harry E. Squire.

A. J. Crocker is President of the California Bridge & Tunnel Company. Included in the list of company men on the Estuary Subway are Francis Betts Smith, consulting engineer; D. E. Root, general superintendent, at Alameda and Oakland; A. A. Horwege, superintendent of construction, and G. T. O'Brien, construction engineer at Hunter's Point.

Allowable Use of Septic Tanks in Individual Installations

A SEWAGE disposal system for homes, camps, or isolated buildings in parks where sewers are not available and yet where water-supply is available, has been developed by the United States Public Health Service. This system consists of a septic tank and a filter bed.

The septic tank itself has a capacity based on the number of people for whom service is to be provided. The recommended rating is 30 gallons per person for 24-hour service, with a minimum capacity of 200 gallons. Under conditions prevailing in the tank, bacteria develop which break up the solids and liquefy a considerable portion. As some solids are not affected and are left as undigested sludge, an inspection of the tank and removal of the solids is necessary at intervals, depending on the use given the system.

The effluent or discharge from the tank is disposed of by subsurface irrigation, usually by distributing the liquid by means of 4-inch tile lines laid 12 to 24 inches underground. The discharge from the tank should in all cases be kept underground to prevent objectionable odors and unsanitary conditions.

If special difficulties are to be overcome, local health authorities should be consulted. Proper sewage disposal is the function of a qualified sanitary engineer, whose experience and training make his advice valuable on all municipal installations, large or small.

Municipal Light and Power Plant in City of 4,000

Successfully Operated Since It Was Started, Nine Years Ago

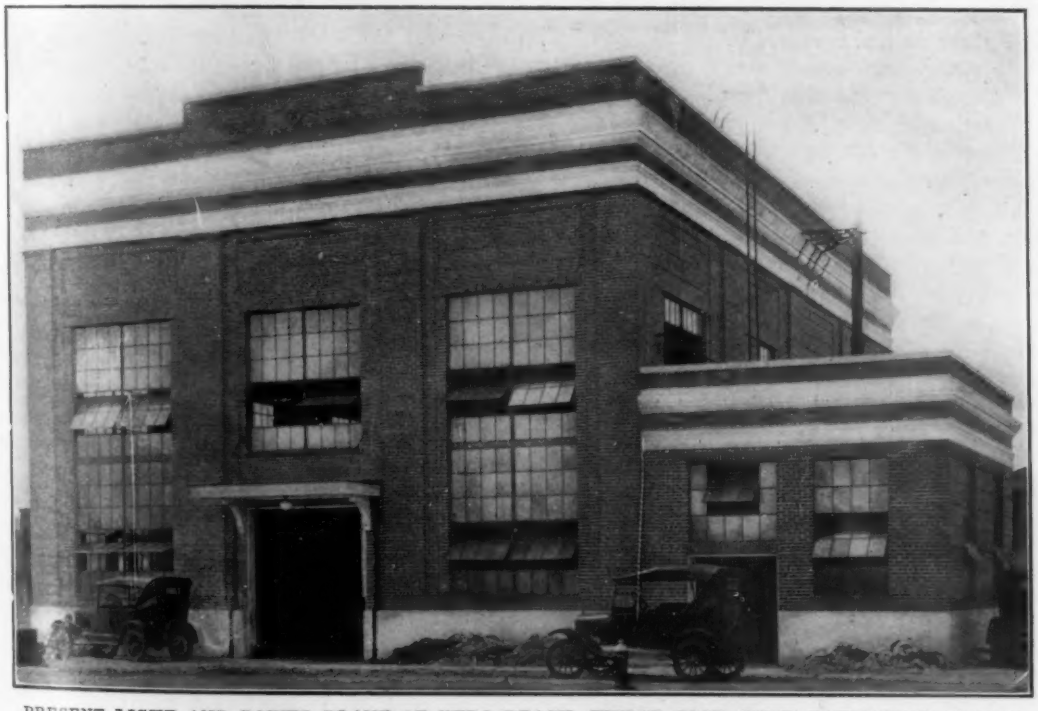
FROM its initial stages in 1917 the Vero Beach municipal light and power plant has steadily increased until it is now supplying adequate power for a city of 4,000 population and has a bond issue authorized to provide for additional units and line extensions, costing $100,000, to meet the growing demand of the fast-developing municipality.

In 1917, Vero Beach, Florida, then known as Vero, was in its infancy. Roads were few, and houses scarce, and cattle ran unchecked through streets, alleys, yards, and gardens. The first attempt at electric lighting was the installation of a Delco system, which supplied the small hotel and an office or two. A company was then formed, of which Joseph Hill was President, and steps were taken for a permanent plant. When the new Vero electric plant began operation, in November, 1917, there were 40 patrons who received service from dark to 11 o'clock and on Wednesday mornings at the rate of 18 cents per kilowatt-hour.

The city took over the plant to operate as a municipal utility in November, 1920. The

BUILDING WHICH HOUSED THE ORIGINAL MUNICIPAL ELECTRIC LIGHT PLANT AT VERO BEACH, FLA., IN 1917

At the left is shown one of the new King standards with Novalux light unit, of which 227 have been installed this year



PRESENT LIGHT AND POWER PLANT OF VERO BEACH, WHICH COST, WITH EQUIPMENT, $182,600

capacity of the system at that time was 35 kw. It was housed in a small frame shed. The plant was moved to larger quarters in 1921, on the site of the present modern structure. The capacity was increased by the installation of another 100-horsepower engine. Street lighting was then begun, with 50 units along the main thoroughfares.

Since that time three bond issues, totaling $182,600, have made possible the construction of a modern brick and steel power-plant with three power units of 100, 300 and 750 h.p. respectively, and a capacity of 785 kw. In the height of the winter season 950 patrons have been supplied, the average being 875. This includes over 150 cooking and heating stoves in homes and restaurants, while power is also supplied to the ice plant and bottling works, two newspaper plants, two planing mills, a laundry, a novelty wood-working shop, cement products plants, two packing-houses and the municipal water-works.

The income from operation of the light and power plant averaged $6,000 per month last year. Rates were reduced June 1, 1926, and now stand as follows:

SCHEDULE A—RESIDENTIAL	
First 30 kw. hr.	10 cents
Next 20 kw. hr.	7 cents
Next 140 kw. hr.	6 cents
Next 110 kw. hr.	5 cents
Over 300 kw. hr.	4 cents
SCHEDULE B—COMMERCIAL	
First 300 kw. hr.	10 cents
Next 200 kw. hr.	9 cents
Over 500 kw. hr.	8 cents
SCHEDULE C—POWER	
First 100 kw. hr.	8 cents
Next 100 kw. hr.	7 cents
Next 200 kw. hr.	5 cents
Over 400 kw. hr.	4 cents

Minimum rate of $3 per month for 3 horsepower or under; 50 cents for each additional horsepower.

For the addition of another unit to the plant and further extension of lines to accommodate the extended residential limits, a bond issue was recently authorized providing $100,000. The increase in capacity will take care of the new white-way lighting system just installed at a cost of $35,000, which includes 227 King standards and Novalux units.

Highway Construction to Prevent Accidents

By Frederick Stuart Greene

Commissioner of Public Works, New York State

IF there existed a record of the causes of all highway accidents, it would probably show that 90 per cent of our road wrecks are due to careless driving, 5 per cent to mechanical defects in the car, and but 5 per cent to improper construction of the highway. In designing roads, however, to prevent this last 5 per cent of accidents, the engineer will automatically eliminate a considerable portion of the 90 per cent chargeable to recklessness, for, though the driving on a road designed for maximum safety may still be reckless, the safety features provided will frequently prevent wrecks.

Main Causes of Accidents

The outstanding causes of highway accidents are: first, grade crossings of railroads and trolleys; second, the fact that a majority of our roads (all roads ten years or more old) were built to accommodate a traffic speed of 5 to 6 miles an hour, whereas the motor-car seldom travels less than 30 miles an hour.

There is but one 100 per cent remedy for the grade-crossing evil—a well-designed elimination, either an overhead or an under-crossing.

Danger Signs

Another cause for accidents is the frequency of unnecessary signs erected either by ambitious motor clubs or by the too enterprising advertiser. A danger sign should be placed only at points where there is real necessity for caution. Signs placed elsewhere produce the same effect as the oft-repeated cry of "Wolf! wolf!" At right-angle turns and at approaches to narrow bridges New York State erects a special sign. This is a large board, 11 feet, 2 inches long by 7 feet 2 inches high, with a checkered black-and-white border and the word "Stop" painted in large letters.

Recently, New York State has awarded a contract for cast iron warning signs and posts, and it is hoped to erect these on all state highways as quickly as funds and other conditions permit. If it were possible to get all states to cooperate and adopt signs uniform in dimension and other essentials, such as height from the ground and distance from the pavement, it would mean another step in the right direction. The new signs are similar in general aspect to those used in Pennsylvania, to which state

New York gladly gives credit for the idea it has adopted.

Designing for Safety

In designing a road, the line of sight, width of pavement, height of crown, percentage of grade, and surface of pavement are five features all vital to safety and so closely dependent one upon the other that it is hard to establish their relative importance. I believe that the standards established by the Federal Government for curves—which in any but an open country fixes the line of sight—are rational and safe. At any point, except on village streets or around abrupt precipices, no curve should have a radius of less than 500 feet. The minimum vertical curve should have a radius of 200 feet on moderate grades, while a vertical curve at the apex of two 7 per cent grades would not be less than 500 feet. In New York we strive to have not less than 300 feet of unobstructed view at all horizontal curves.

Banking and Widening Curves

The radius, however, is not the only factor to be studied carefully when laying out a curve. In spite of the assertion that banking and widening curves encourage speeding, I consider that it would be as shortsighted not to bank curves on a modern highway as it would be to attempt to level tracks on a railway curve. We must now build for a speed of 30 miles an hour or we are behind the times.

Crown

One of the most frequent causes for wrecks on New York State roads is the height of the crown, especially on old waterbound roads which have been given a bituminous surface. These pavements were frequently designed with a crown of 1 inch to the foot, and as they were seldom built more than 16 feet wide, it meant that the center of this narrow roadway was 8 inches higher than the edge. It also meant that if a car traveling at from 30 to 35 miles an hour were suddenly forced to swing from the center to the side of the pavement, it was more than an even chance that it would be overturned. New York State is now designing concrete roads, but even the comparatively low crown of ¼-inch to the foot formerly used has been decreased to ⅛-inch to the foot.

Were it not for the advisability of ridding the pavement quickly of water, we should build them with no crown at all.

Grades

Owing to the ability of an automobile to negotiate steeper grades than an engine running on steel rails, the question of proper grades for a highway is in nowise similar to the same question when applied to railways. The problems are so radically different that before the old railroad engineer can qualify for highway work, he must throw overboard some of the theories he has perhaps cherished for years. In my opinion, it is uneconomical to establish 7 per cent as the maximum grade for a highway. This limitation may be wise for some of the Mid-West or Southern states, where a hill is a curiosity and where the right of way is not expensive, but in states where rolling country is the rule and in thickly settled states, it is frequently good engineering and good financing to go as high as 12 per cent to get over a short hill. Lately there has been a good deal written about the operating expense of lifting a car over a grade, but if one has to cross a hill where it is impracticable to cut off the top, there is no difference in cost between climbing a thousand feet up a 7 per cent grade or 700 feet up a 10 per cent grade. From statistics taken in Maryland and from our experience in New York State, more accidents have occurred on tangents than on curves. This is due solely to the fact that drivers are naturally more careful at curves, not that curves are safer than tangents. As gasoline does not worry about a grade and as curves produce danger-points in any highway, I would rather design a short 10 or 12 per cent grade than a 500-foot radius curve.

Width of Pavement

No state highway should be built with a pavement less than 18 feet in width. Eight feet may be given as the minimum width necessary to carry one-way traffic, but for a speed of 30 miles an hour, a 16-foot, two-way pavement is not comfortable, economical, or safe. Eighteen feet is needed for the sway of two fast-moving cars when passing, anything less forcing the outer wheels from the pavement, causing heavy shoulder maintenance, and apt to result in a sideswipe. A 20-foot pavement is better and safer than one of 18 feet, but for economy's sake we build this width only in the more thickly populated counties. The question of building special highways for truck traffic is now frequently raised. I believe motor-truck roads will come eventually, but the necessity for them has not yet arrived.

Guard-Rail

The old-fashioned guard-fence with its wooden posts and rails is not only an extravagant one to maintain, but it is far less effective in preventing serious accidents than are posts and cables. The wooden fence not only fails to stop a fast-moving or heavy car from going down an embankment, but there are records of accidents where the splintered rail has pierced the floor of the car and injured the occupants more than the run down the incline might have done. The posts with cables act as a net which catches and resists the momentum of the car with some degree of flexibility. Concrete posts were adopted largely to conserve lumber. When it is remembered that every two or three posts in the old-style fence represents a tree which in a few years could have been used for lumber, this saving is not to be ignored, even if we forget the longer life of the concrete posts.

Non-Skid Surfaces

As rubber tires will slip on a wet, smooth road, no highway can be considered safe unless the surface of the pavement tends at least to retard skidding. There are but few brick or granite block pavements being built today. Nothing short of repeated applications of sand will safeguard a bituminous pavement, but there is no good reason why a concrete pavement should not be laid with a non-skid surface. It is simply a matter of drawing a broom across the surface before the concrete has set. To my mind, so far from being a detriment to the concrete, brooming is an advantage, as it breaks up the laitance and tends to prevent surface scaling on the pavement. It is a matter of regret to me that every state does not have a brooming requirement in its highway specifications.

ACKNOWLEDGMENT.—From a paper read before the New York State Safety Congress.

Protection of Reservoirs

SUGGESTIONS that may add to the value of water-power and water-supply developments are made in a bulletin just issued by the Forest Service, United States Department of Agriculture, entitled "The Financial Limitation in the Protection of Reservoirs," by W. W. Ashe. It is of interest to investors in water-power and in municipal water-supply securities as well as to managers of such properties and to engineers.

Storage of water is becoming a recognized factor in hydroelectric development, just as it is necessary in most cases for municipal supply. This bulletin shows that with storage there enters the problem of siltage through erosion of soil, an insidious agency which may cause loss of pondage and consequent reduction in the capacity of reservoirs.

The rapidity of erosion and of silting-up of reservoirs is affected by different physical and meteorological conditions in the different regions of the United States. Over the greater portion of northern and northwestern United States and in Canada erosion is not the serious problem that it is in parts of the Southeast and particularly in portions of the Southwest. The bulletin calls attention to the high silt burden of certain streams and the rapidity with which storage capacity of reservoirs is reduced, as in the case of the Colorado River (of Texas). The reservoir at Austin on this river lost more than half its capacity within ten years. Many other streams carry a silt burden fully as great as that of the Colorado. On the basins of certain of these streams, according to Mr. Ashe, the surface conditions are such that erosion can be materially reduced. On others the conditions are such that erosion can be only slightly lessened. On these it is a natural condition, the result of concentrated rainfall on surfaces naked of protective vegetation on account of irregular rainfall. There are other regions, the bulletin points out, where protection of the surface is highly efficacious in reducing erosion.

It is shown that it is possible to ascertain the rate of silting which is taking place and from this to determine the capital value of the storage capacity, the loss of which might be expected within a given period. It is also possible to determine the extent to which excessive erosion may be checked by artificial means. Mr. Ashe proposes a formula for determining how much money could be economically expended to maintain this capital value, which otherwise would be destroyed by siltage. He points out that in case woods are artificially established for the purpose of securing soil cover and reducing erosion, a definite return can be expected from the investment therein, but that power and water companies are justified in making additional expenditures which would be within the capitalized value of the storage capacity which will be preserved.

In the southern Appalachians as well as elsewhere there are alluvial lands which have been injured during floods by gullying or by the deposit of sand and gravel. Where such conditions exist, there is, in the opinion of Mr. Ashe, an opportunity for the establishment of settling-basins. Settling-basins of the kind he proposes would not only result in the elimination of much silt from the stream but also would bring about the rehabilitation of the devastated lands, which after being built up by deposit of the sediment would again be available for farming. Since this sediment as a rule consists largely of the most fertile soil eroded from the surface of the watershed, areas thus built up would be very productive.

Copies of the bulletin, which is designated as Department Bulletin 1430-D, can be obtained from the Forest Service, United States Department of Agriculture, Washington, D. C.

Drafting and Enforcing a Building Code

Part II

By Lent D. Upson

Director, Detroit Bureau of Governmental Research

THE enactment of a building code is only the first step in securing structural and engineering safety. The enforcement of the code must be delegated to a competent authority, independent of the political pressure that will be brought by those interests desiring modifications of the law for their benefits; otherwise, little good will result. In addition to competent supervision and facilities for interpreting debatable provisions of, and allowing reasonable exceptions to, the law, provision should be made for an engineering staff competent to examine the technical building plans submitted and an inspectional force adequate to see that the approved plans are conformed to.

Organization for Enforcing the Code

Suggestions relating to the drafting of building codes were embodied in Part I of this article, which appeared on pages 685-8 of the November number. This second and final installment relates to problems of effective enforcement. The two installments, comprising a part of the chapter on Safety from Dr. Upson's forthcoming book, "The Practice of Municipal Administration," are published through the courtesy of The Century Company.

Submission of Plans

Persons desiring to construct or remodel buildings of any character, install heating or power equipment, or erect signs upon buildings, should be required to obtain a building permit from the safety engineering authorities. This permit should be granted only after plans or sketches have been submitted, examined, and approved as conforming to the code, affidavit has been taken as to the estimated cost, and the proper fee paid. A majority of building projects are of such small importance that it is not necessary to require the submission of detailed plans to the building department. Some arbitrary limit of cost is fixed, say at $1,000 to $2,000, within which only rough sketches are required. These sketches, and the application, will ordinarily be examined when presented, so that the builder will suffer no delay. The department should, however, reserve the right to require detailed plans if conditions appear which are out of the ordinary.

Examination of Plans

The plans of more pretentious buildings should be presented in detail, and should be prepared by registered architects and engineers. Many states now require the examination and registration of members of these professions, and important buildings and appurtenances should not be designed by people who cannot qualify accordingly. Such plans should be left for examination, and should be in duplicate, one to be returned when properly approved, the other to be retained in the files of the department for reference. If the department, after examining plans, will refuse to give advice on incomplete or inaccurate construction details, or to act in any way as a designing agency, incompetent private designers will soon disappear. In Massachusetts, as a further safeguard on engineering requirements, the petitioner for a permit is required to make an affidavit that all requirements of the building code have been complied with. The examination of important plans requires time, and there will be criticism if the actual construction of a building is delayed on this account. In New York City this difficulty is circumvented by issuing a foundation permit in advance of the permit for the superstructure.

Approved plans, with any correspondence relative to them, should be given a filing number and preserved for reference. The files may be catalogued by character of structure, name of owner and contractor, or location. This last basis is best, an index of street and numbers affording a simple and immediate reference.

Inspection of Construction

The number and character of the inspections varies with the type of building, ranging from the almost continuous and technical inspection required on a monolithic reinforced concrete structure to the few inspections necessary on a steel frame building. The inspections are by the several regulated trades, such as construction proper, electric equipment and wiring, heating and ventilating, and plumbing. Prompt inspection is necessary to prevent expensive delays in construction, and to expedite matters the contractors usually notify the authorities as to when work will be in a proper condition for inspection.

Buildings

For inspection purposes, a city is laid off in districts of requisite size for each type of inspection, and an inspector is assigned to each district. At daily intervals each inspector receives a work sheet containing the inspections to be made, as compiled from the office records of construction under way and from notices of inspections requested. Each day there is added to this record a report on each inspection made, which is ulti-

mately transferred as a permanent record to an inspection file geographically arranged. It is not practicable to file these reports with the original plans, since inspections continue for many years after a building is completed. The inspection reports and the approved plan can be correlated easily when necessary.

Appurtenances

In addition to construction inspection, there must be periodic examinations of elevators, heating and ventilating apparatus, power-plants, refrigerating machinery, etc., supplementing that given by the underwriters for insurance purposes. A list of such equipment requiring current inspection is maintained in the department, and a sufficient number of inspectors is assigned to cover everything at proper intervals. A record of such examinations is filed in the department, and notice is posted on the premises as to the date of inspection and the conditions found.

Old Buildings

A certain amount of inspection is necessary on older buildings to determine changes in use that may affect safety, to locate deterioration of structural parts with age, and to secure compliance with newer regulations governing fire-escapes, proper exits, and enclosure of stairs and elevators. A portion of the inspection force should be delegated to reinspection work only, and not permitted to make any inspections on new buildings; otherwise, when the department is busy, reinspection work will be put into the background. The inspection of new work is pleasant and easy, and will absorb the attention of the entire inspection force if there is no restraining influence. The inspection of sanitary and housing conditions is properly an activity of the health, rather than the building, authorities.

Number of Inspections

The proper and economical administration of the building department requires that inspections be made sufficiently often to safeguard the interests of the public, but with no unnecessary frequency. Too frequent inspections only irritate the contractor and furnish an excuse to the inspector for finding trivial derelictions that will justify his job to his superiors. The proper number of inspections for each type of construction is a matter to be determined by the person in charge of the department.[1]

Enforcement of Requirements

It is one matter to require that building plans conform to code standards, and quite another to compel specific performance in the actual construction. The inspectors, if honest and competent, will report deviations from the code to their superiors in the department. What action shall be taken? To be sure, the head of the department can proceed to secure a warrant for the arrest of the offending builder and appear in court against him, and after the usual legal delays and annoyances the offender may be fined or censored. But this handicaps the work of the department, compels inspectors to spend time in court rather than in the field where they belong, and makes unnecessary enemies of persons who may have violated the code either unintentionally or because of the chicanery of subordinates or subcontractors.

The first proper step in enforcement is a warning by the inspector that the code is being violated and a follow-up inspection to determine whether the warning has been heeded. Ordinarily, such action is all that is necessary. Some cities, e.g., Portland, Ore., adopt the more formal plan of giving a written notice to the responsible parties, and in case correction does not result within a reasonable time, serving a second notice designating a number of days within which compliance with law must be had. If proper action is not taken, a warrant for the arrest of the offending builder is secured. In Jacksonville, Fla., in addition to warning, a notice is placed on the job to the effect that part of the work has been condemned as not being in accordance with law. Such notice immediately brings the wrath of the owner upon the contractor. Other cities, as New York and Toledo, issue a blunt stop order through the inspector when a contractor is found proceeding without a permit or in other violation of law. Such stop orders are backed by arrests if necessary. In Minneapolis a person starting work without a permit is compelled to pay a double fee.

As a means of further controlling code violations, a few cities have experimented with the licensing of building contractors. The results have not been satisfactory except as a means of controlling manufacturers and vendors of materials whose activities cannot be readily controlled by inspection. The application of the plan is limited by legal considerations, and by the fact that the revoking of licenses results in the involuntary idleness of employees, and in unpopularity with the public.

Fees

Practices for determining the amount of the fee for the approval of plans and subsequent inspection of construction differ. Many cities base charges upon the type and cubic contents

[1] The practice of typical cities in this respect is indicated by the following tabulation taken from the Report on Building Department of the City of Rochester (Rochester Bureau of Municipal Research, 1921), p. 35:

	Indianapolis	Detroit	Columbus	Rochester
Cost $1 to $2,000				
New work ..	2	2	1	2
Alterations .	1-3	2	1	2
Cost $2 to $10,000				
Dwellings ..	2-4	4	3	4
Commercial .	3	2	3	5
Alterations .	3-5	2	3	6
Cost $10,000 and up, per unit of $10,000				
Dwellings ..	5	6	4	3
Commercial...	5	4	4	4
Alterations .	5	4	—	5

of the structure to be erected. Other cities collect a fraction of a per cent of the estimated cost of the building. The latter practice is conducive to underestimates and perjury, and if the rate varies with the type of structure is difficult of application in those of combined use, such as buildings with stores below and flats above. Some cities use a combination of these plans. Under any plan, the department should be self-supporting, on the theory that the service rendered is largely of particular rather than general benefit.

Cost of Building Control

As with many municipal activities, the authorities responsible for the control of building construction generally complain of inadequate financial support. Even though the department is made self-supporting, or practically so, through the imposition of fees, city councils are frequently reluctant to put the fees sufficiently high to provide for the reasonably thorough examination of plans and inspection of work under construction and the reinspection of old work. The importance of the duties of building departments varies with different communities, as does the thoroughness with which the duties are performed. In consequence, the yearly expenditure for building control in the cities of the United States ranges from five to sixty cents per capita. It is advanced by some authorities that a yearly expenditure of less than twenty cents per capita does not produce worth-while results, and that an expenditure in excess of twenty-five cents per capita is unnecessary. Others believe that a per capita cost of fifteen cents will produce good results. Amount of construction done and not population, however, should determine inspection expense, and between the limits of expense just indicated lies a more precise figure to be determined by the particular requirements of the municipality, assuming that a maximum of service is given for the money spent.

Measurement of Service

With respect to efficient service, the activities of a building department are of a character that may be measured with a precision not possible for all city functions. To be sure, the results of building control as evidenced in unsafe buildings, fires, and accidents are not as appreciable as are morbidity and mortality rates when applied to the work of a health department; but the efficiency of even plan examiners and building inspectors can be gaged as exactly as can the efficiency of visiting nurses and food inspectors.[1]

Plan Examiners and Engineers

The work of plan examiners and engineers is relatively most difficult of appraisal, because in addition to checking plans of varying complexity, time must be spent in consultations with architects, engineers, and builders. It is practicable, however, to require a daily statement from each plan examiner and engineer as to the amount and character of work done. Such statements can be used to weed out the most inefficient of the staff, and the mere recording of each day's work inspires a friendly rivalry and stimulates a maximum of activity.

Work Required of Inspectors

The work of inspectors may be divided into office work, transportation, and inspection, and is more easily measured. The daily service records of the inspectors should indicate the amount of time spent in the office, and office visits should be limited to one a day. When in the office, inspectors have an inclination to stay there, are dilatory in the preparation of their reports, and are interrupted by telephone calls and visitors. One of the first problems of departmental procedure is that of getting inspectors into the field at as early an hour as possible. The service records should also indicate the time spent in transportation to each job and the

Public Negligence in Relation to Building Conditions

In Boston, on January 15, 1919, a molasses tank collapsed, resulting in fourteen deaths, sixty persons injured, and large adjacent property damage. The findings of the court of inquiry are pertinent, in so far as they suggest the very prevalent negligence in relation to building conditions. The Court said:

"The chief blame rests upon the public itself. This single accident has cost more in material damage alone than all the supposed economies in the building department. Laws are cheap of passage, but costly of enforcement. They do not execute themselves. A good law poorly administered is worse than a poor law well administered. A public which, with one eye on its tax rate, provides itself with an administrative equipment fifty per cent qualified, has no right to complain that it does not get a 100 per cent product, and so long as it accepts political influence as the equivalent of scientific attainment in positions which demand such attainment in a high degree, so long it must expect breakdowns in its machinery. . . . It is no part of the business of this court to find a scapegoat to order for an indifferent or niggardly public. . . ."

[1] An informing paper on "Efficiency in a Building Department," by H. E. Plummer, inspector of buildings, Portland, Ore., appears in the Proceedings of the Tenth Annual Meeting of the Building Officials Conference (1924), pp. 59-80.

time spent on each inspection. The number of daily inspections that will be accomplished by inspectors varies with the type of work inspected, distance to be covered, method of transportation, and to some extent the season of the year.[1] In Detroit building inspectors average twenty-four to twenty-five inspections per day; electrical inspectors, twenty-two or twenty-three; and plumbing inspectors, twenty-one or twenty-two. Some authorities hold that an average of from twelve to fifteen inspections on approved alterations and new work are sufficient to constitute a good day's work. Administrative authorities concerned with the personnel of a building department must have these data for sound conclusions: the average number of inspections necessary to each type of permit; and the average number of inspections that reasonably may be expected from each inspector of each type of construction. With a knowledge of the actual or estimated number of permits of each character over a given period, it is a simple matter to calculate the number of inspectors necessary to perform the work required.

These data of number of inspections should be translated into cost per inspection by dividing into the total cost of inspections. This will give a net cost. The gross cost should be secured by dividing the total cost of operating the department by the number of inspections made. These figures should be compared over periods of years in the same cities, and with similar data from other municipalities.

[1] H. E. Pimmer, ibid., p. 65 et seq. Tables of inspection requirements prepared by the building department of Portland, Ore., are based on the following estimates:

Type of Inspection	Inspections per Permit	Daily Inspections per Inspector With Auto	Daily Inspections per Inspector Without Auto
Buildings	2.75	25	18.5
Electrical	2.70	20	15.3
Plumbing	2.20	16	12.0

Use of Automobiles

It will have been noted that the number of inspections is materially increased by the use of the automobile. In Portland, Ore., it has been calculated that the use of automobiles reduces the cost of inspections from twelve to fourteen per cent. In Detroit, an inspector with a car makes one-third more inspections than a man on foot. In that city, municipally owned cars cost about $95 a month for operation. However, this cost is reduced by allowing $50 a month to each inspector who owns his own car, deducting two dollars for each twenty-five miles less than 625 miles run per month. The inspector must be relied upon for the mileage record, but by occasionally checking the distance between jobs, dishonesty is reduced to a minimum.[2]

Consolidation of Inspections

Examination of any city budget will indicate the large number of different inspections of private activities made by representatives of the city —of sanitary conditions by the health department, of safety engineering by the building department, of defective sidewalks and streets by the public works department, of commercial amusement by the recreation department, of fire hazards by the fire department, and of all these conditions by the police. At first thought it might appear that economy would be served and annoyance eliminated by consolidating certain of these inspections. However, the requirements to be met are so diversified that it is questionable whether any such plan can be satisfactorily materialized.[3]

[2] On the whole, however, a flat allowance each month is preferred to the mileage basis.

[3] In 1921 the Detroit Bureau of Governmental Research made a study of the inspection situation in Detroit and concluded that consolidation was not feasible. It is reported that an experiment in consolidated inspection is under way in Chicago, but the results are not yet available.

Thomas A. Edison on the Scientific City of the Future

WHILE the vast undertaking of separating railroads and highways now crossing each other at grade is but in its beginning, Thomas Edison, in an interview on "The Scientific City of the Future," written by Edward Marshall in the December number of *The Forum*, looks forward to a time when it will probably be necessary to face a similar problem in connection with grade crossings of busy thoroughfares. The pedestrian must be safeguarded, because, as Mr. Edison points out, statistics indicate that a considerable proportion of accidents to pedestrians are the result of collisions with vehicles rounding corners.

In the interview Mr. Edison suggests that the raising of one street above the other at important intersections would be one method of eliminating such accidents, but he admits that were this attempted there would still remain to be solved the question of easy access from one street level to the other. He expressed confidence, however, that traffic experts will be found who can overcome these difficulties—perhaps by establishing some system of express and local streets.

In Mr. Edison's opinion, also, it is not too soon to start planning for traffic problems in the air. He foresees the perfection of an airplane that in addition to going forward, may by the helicopter principle be made to fly straight up or down at the operator's will, and that preparations should be made for handling the tremendous increase in air traffic that will come with the advent of this new type of machine. We should, for instance, be ready to provide landings on the roofs of the tall buildings of our cities.

The constant increase of skyscrapers in our already overcrowded cities is also commented upon by Mr. Edison. If American municipalities continue to allow the erection of structures each large enough to house a small city in itself, he foresees the time when the occupants of such buildings, entering or leaving the surrounding narrow streets at approximately the same time, will so handicap the movement of traffic that an inestimable amount of one of humanity's greatest assets—time—will be lost.

Lastly, Mr. Edison urges that the problems of municipal management be solved in a scientific way, and compares America unfavorably with Germany in this matter—though the interview does not indicate that Mr. Edison is aware of the rapid spread of the city manager form of government in the United States.

Forward Steps

Reported by Municipal Officials, Chamber of Commerce Executives and Others

Regional Planning in Milwaukee County

MILWAUKEE, WIS.—In recent years there has been a pronounced development of the rural district adjacent to the city of Milwaukee. The use of the automobile has materially increased the distance people can live from their places of daily work, and the resulting migration to the outlying districts has caused much confusion instead of the orderly development necessary for modern city life. This was particularly true with respect to platting, street arrangement, provision of streets of ample width on major arteries, and the lack of parks or open recreation spots for the use of the general public. Each unit of government has its own peculiar problems to contend with and cannot be expected of itself to give much thought to the problems of its neighbor. In Milwaukee County there are eighteen separate units of government, and the County Board, in creating a Regional Planning Department, had in mind the creation of a body which would cooperate with the various incorporated municipalities and in particular with the seven towns in the county, with the purpose of providing a better place for human habitation.

At the time of its organization in 1924 there were three major activities before the Department, namely, the development of the proposed county parkway system, zoning of the outlying districts, and regional planning or platting. In addition to these, several other activities have been undertaken

TWO OF MILWAUKEE COUNTY'S WELL-PLANNED STREETS, 120 FEET WIDE
Top.—Washington Boulevard, having a center strip and two roadways
Bottom.—Lake Street, with a pavement 60 feet wide

April 1925
Scale

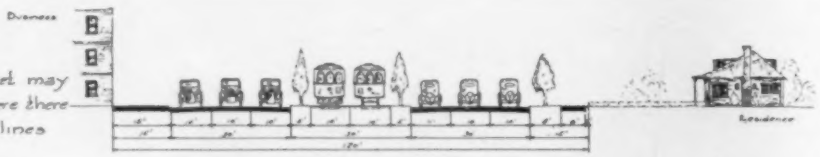
PLAN FOR
SUGGESTED FINAL DEVELOPMENT
OF
MAJOR AND SECONDARY HIGHWAYS
MILWAUKEE COUNTY ~ WISCONSIN

Milwaukee County
Regional Planning
Department

90 FOOT THOROUGHFARE
Providing for 6 lines of traffic

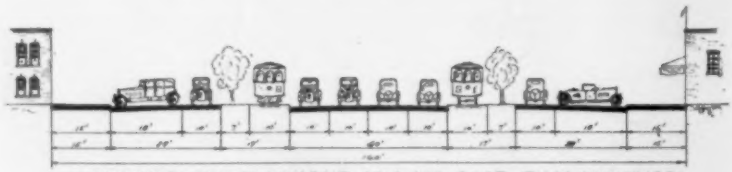
Passenger loading platforms may be provided at street intersections

110 FOOT THOROUGHFARE
Providing for 8 lines of traffic



Center 30 feet may be parked where there are no car lines

120 FOOT THOROUGHFARE
Providing for 8 lines of traffic



POSSIBLE DEVELOPMENT OF A 160 FOOT THOROUGHFARE
Provides for through traffic and local business requirements

ANOTHER POSSIBLE DEVELOPMENT OF A 160 FOOT THOROUGHFARE
Through a residential district

from time to time, among them general park engineering, the preparation of a tentative plan for a system of major highways, and the checking of all plats submitted to the County Board for approval.

Detailed plans for about twenty miles of a county parkway system have been prepared, and the first of the parkway projects is now being appraised. Active work on the zoning of the county outside of the corporate limits of cities and villages is under way at the present time. Platting schemes covering large areas are being prepared by the Department for use as the land is subdivided. Dedication of about forty miles of widened highways in outlying districts has been obtained.

The actual development of large-scale plans of this nature is of necessity slow, but by continual effort progress can be seen from year to year, and the goal is well worth the effort, time, and money expended.

W. F. CAVANAUGH,
Highway Commissioner and Planning Engineer,
Milwaukee County Regional Planning Department.

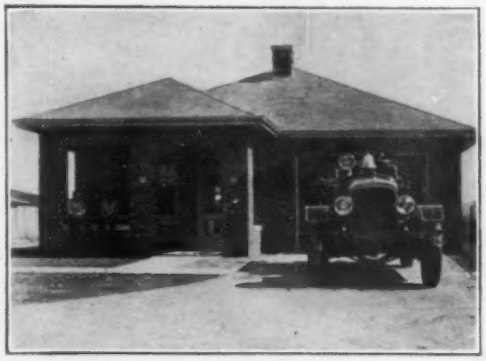
Improved Facilities for Fire-Fighting and Prevention

WICHITA FALLS, TEXAS.—Since the establishment of our Fire Prevention Cabinet early this year, Wichita Falls has made some notable improvements in its fire-fighting facilities. Two additional fire-stations have been erected, several new pieces of modern apparatus have been purchased, and a full-time Fire Inspector has been appointed, whose duty it is to make a thorough inspection of all business houses once each month.

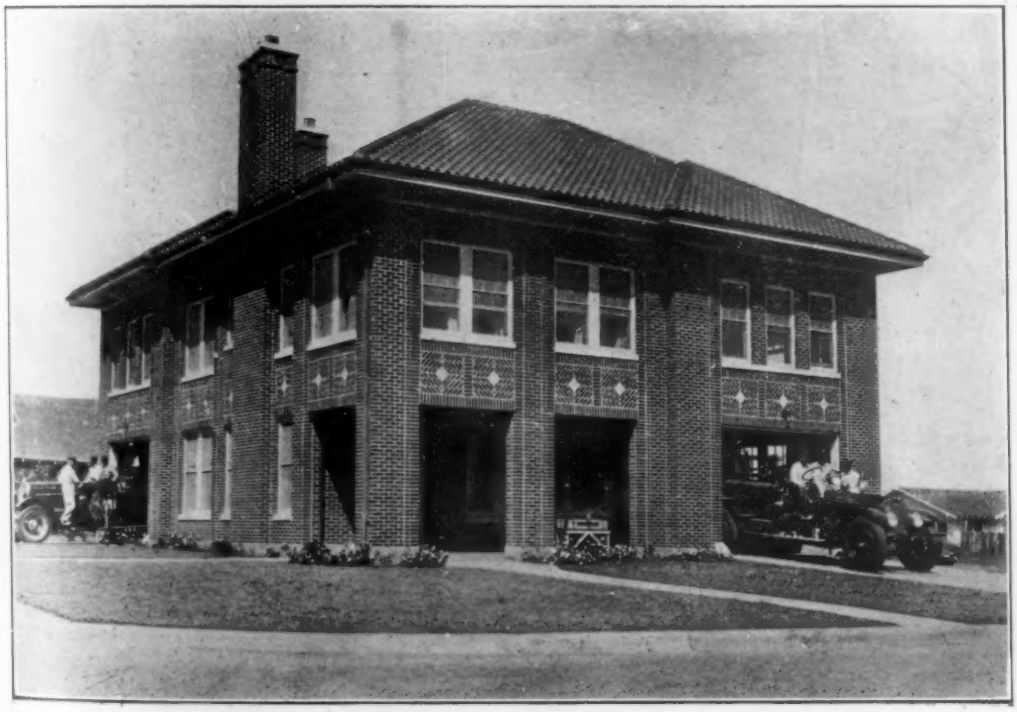
One of the new stations—that of Engine Company No. 5—is located in the heart of the Junior College district, a very thickly settled section of the city. The equipment of this company consists of one 750-gallon American-LaFrance pumper and a Stutz combination hose and chemical truck, both of which may be seen in the accompanying photograph. The new building for Engine Company No. 6, a view of which is also shown, is equipped with one of the two 750-gallon Seagrave pumpers purchased by the city this year.

The city's renewed interest in fire prevention is no doubt largely responsible for the encouraging fact that our fire loss for the first eight months of this year amounted to less than half of the same period for 1925.

J. L. McCLURE,
Chief of Fire Department.



ENGINE CO. No. 6 STATION, WICHITA FALLS



NEW STATION OF ENGINE COMPANY NO. 5, WICHITA FALLS, TEXAS

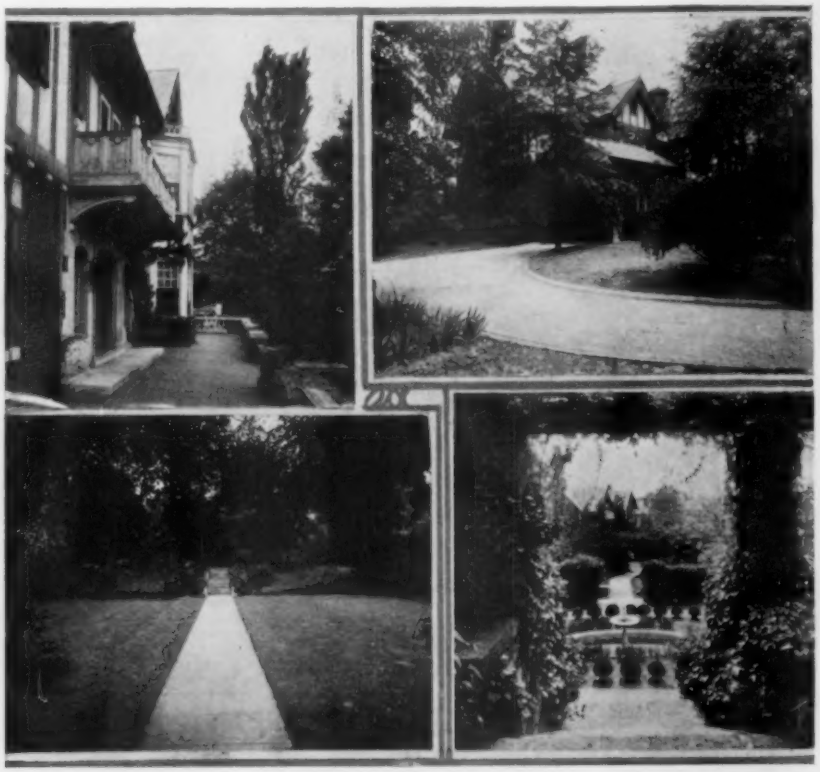
Art Museum a Gift to Atlanta

ATLANTA, GA.—One of the foremost ambitions of the many people in Atlanta interested in the cultural progress of their city was realized in an unexpected way a few months ago when one of our citizens, Mrs. James Madison High, presented her former city residence to be used as a permanent art museum for Atlanta.

This generous gift comprises a handsome building of Tudor architecture standing in attractively landscaped grounds, covering an area of more than 25,000 square feet in one of the city's finest residential sections. The value of the property has been conservatively estimated at $100,000. The museum was formally opened to the public in October. An exceptionally fine art exhibit was brought from New York for this occasion and was placed on display for a period of one week.

COOPERATION BETWEEN ART ASSOCIATION AND CHAMBER OF COMMERCE

The activities of the Art Association have always received the support and cooperation of the Atlanta Chamber of Commerce. In May, 1924, the Chamber, through its Art Committee, was largely responsible for bringing to this city its first exhibit of fine arts, the collection having been secured through the Grand Central Art Galleries of New York. This exhibit was so generously



FOUR VIEWS OF THE BEAUTIFUL PLACE GIVEN BY MRS. J. M. HIGH AS THE PERMANENT HOME OF THE ATLANTA ART MUSEUM

The spacious rooms and halls lend themselves readily to use as an art gallery, and the grounds will accommodate numerous pieces of sculpture

only conditions of the gift are that the property shall be known as the High Museum of Art and that it shall remain the property of the Atlanta Art Association as long as it is used as a museum for the benefit of the people of the city. In placing the care of the new museum in the hands of the Art Association, the donor has paid a well-deserved tribute to the work of this organization, which has for many years successfully endeavored to foster art appreciation and to promote and encourage the study of art among the people of Atlanta.

The slight remodeling of the building that was necessary has already been completed, and the supported by the community that the project was repeated the following year. Interest in these exhibits spread throughout the South, and a number of cities have since followed Atlanta's lead in giving their citizens the opportunity of enjoying similar collections of valuable works of art.

It is hoped that the distinctive step taken by the donor of the museum will prove an incentive to other public-spirited citizens of Atlanta to assist the Art Association in enlarging the scope of the project, making it in time a conspicuous example of this city's cultural development.

BENJAMIN S. BARKER,
Secretary, Atlanta Chamber of Commerce.

Establishing Building Lines in a Town of 12,000

WINCHESTER, MASS.—Winchester is a high-grade New England town. It is not large, having a population of about 12,000, but what it lacks in population is made up in strong public spirit which carries with it the desire on the part of our officials to advance the interest of the people, including the physical aspect of the town.

As the town is almost exclusively residential, it has not been difficult to secure the adoption of building lines, although, when the proposal to establish such lines was first advanced, some of the people seemed to think the town was trying to take for street widenings the areas enclosed between the street layout lines and the proposed setback lines. This thought was shown to be erroneous, so that now the citizens cheerfully submit to the restrictions imposed by the building lines. Frequently, when individuals have signed waivers of damages, they have been told that they were waiving any damage which might be caused by depriving them of the right to build within the restricted area, but that, if the town ever decided to take any or all of the restricted areas, the public would pay them for the land taken. So far as I can recall, we have had only two claims for damage caused by the adoption of building lines. These were in the business section and totaled about $8,000. The damages were not excessive for the benefit derived. On several streets a mile or more in length we have received releases on as much as 95 per cent of the total frontage concerned.

We have been working on the adoption of building lines for ten years, taking six or eight each year during the past few years. We accept no private ways as public ways without, at the same meeting, adopting building lines on such ways. In only two or three cases out of fifty-four to date has the Town Meeting failed to ratify the action of the Selectmen in recommending the establishment of building lines, and at later meetings the town has reversed its former votes and established these lines, thus making a record of having established building lines on all streets where such lines have been proposed.

The building restrictions vary from 5 to 40 feet. Each street is carefully studied from accurate plans and from the situation on the ground and is judged on its own merits. Hearings are held at which all abutters are notified to be present, to be heard if they desire to speak. Their approval, disapproval or suggestions are received, and then final action is taken by the Selectmen on the recommendation to establish or not, as the case may be. The whole matter of consideration of any given restriction project is most carefully covered.

Our streets vary from 30 to 80 feet in width, the majority of them being 40 feet wide. We have not attempted, except in a general way, to lay down rules as to setbacks for streets of given widths, but it is a fact that streets of 60 feet width and more have the greater setbacks. We have established building lines on about 15 miles of streets—which is really twice that, because both sides of the street are restricted. About a thousand properties have been affected. In a suburban town such as ours the frontages in the better sections seldom run less than 100 feet, and some are greater.

The town has been zoned within a few years, but our zoning ordinance does not specify setback from the street lines. The building-line regulations do not take into account anything other than setbacks, but the two together make a good combination for any town or small city to follow if the citizens wish to prevent very serious defects in the physical aspect of the municipality.

JAMES HINDS,
Town Engineer.

Prize-Winning Designs in the Biscayne Boulevard Competitions

By H. T. Frost

THE Jury of Awards in the two competitions in design conducted by the Biscayne Boulevard Association, Miami, Fla., has awarded the first prize of $1,000 for street-lighting and traffic-signal standard designs to S. Grillo, of New York. The first prize of $750 for filling-station designs was awarded to H. Roy Kelley of Los Angeles.

The Jury consisted of Dwight James Baum, architect, New York; Elmer C. Jensen, architect, Chicago, and James H. Gilman, City Commissioner and President of the Bank of Bay Biscayne, Miami. Bennett, Parsons & Frost, consulting architects, Chicago, acted as professional advisors.

The purpose of these competitions was (1) to secure designs for traffic-signal towers and standards and street-lighting standards appropriate for Biscayne Boulevard, Miami; (2) to develop ideas for more pleasing filling-station designs; and (3) to stimulate interest in the designing of better structures for these purposes than those now in general use. While in recent years progress has been made in the development of architecture and art generally, it has not been shared, with rare exceptions, in the design of street fixtures.

Biscayne Boulevard is a level 100-foot street which extends from the center of Miami northward to North East 55th Street (three and one-half miles). It runs along Biscayne Bay through a high-class residential section of Miami. The south end (formerly Bay Shore Drive) is an old street recently widened and

improved. The north two and one-half miles is a new street opened by cutting through fourteen improved city blocks, widening a narrow street (formerly North East Third Avenue) through nineteen improved blocks, and extending the street thus created through the recently divided estate of Charles Deering, into Bay Shore, a suburb of fine homes. Biscayne Boulevard here becomes a Federal highway, which, combined with the Dixie Highway, extends to Jacksonville, Fla., and beyond to the Northern States. The Boulevard is being planted with royal palm trees.

The competitions were announced August 1 and closed October 15. The Jury met October 21, and the sealed envelopes containing the names of the designers, bearing the numbers of the prize-winning designs, were opened October 25.

Thirty-nine drawings were submitted in Competition No. 1, for street-lighting and traffic-signal designs. Three of them were found to be meritorious. With the exception of these three, the Jury felt that little was contributed toward the solution of this difficult problem in street-fixture design. However, because of the specific terms of the program, awards have been made in the case of fourth prize and of the six mentions.

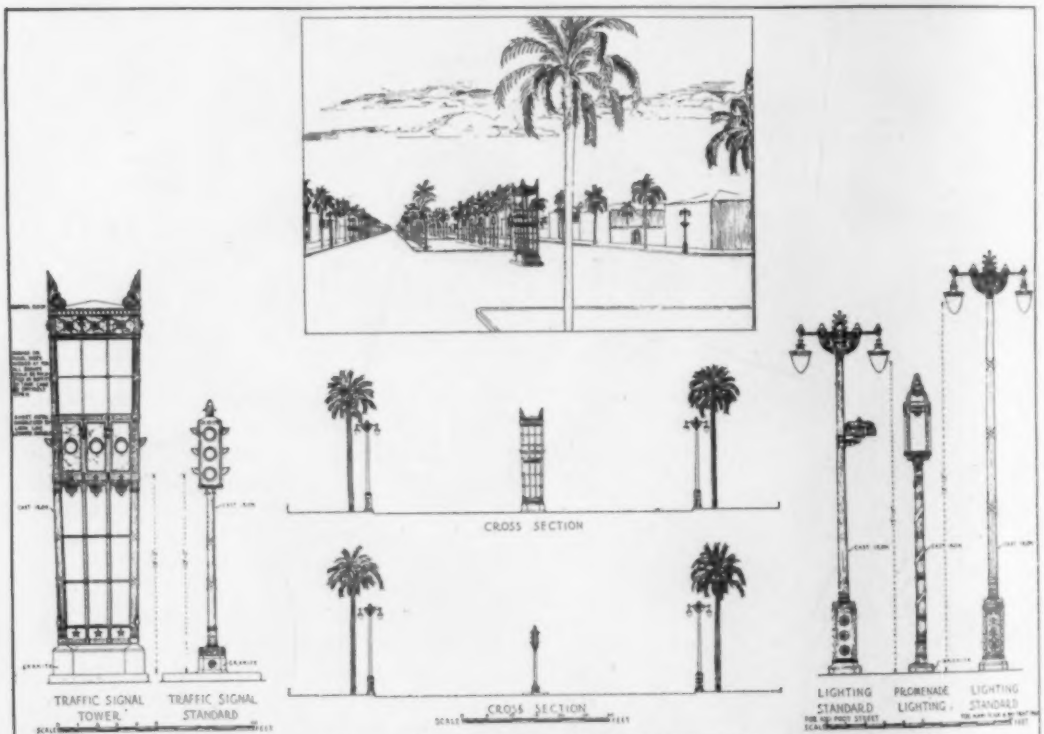
In Competition No. 2, for model filling-station designs, many excellent designs were found. Fifty-four drawings were submitted.

The report of the Jury is in part as follows:

Competition No. 1

The first prize of $1,000 was awarded to S. Grillo, New York. He has developed a very happy solution of a difficult problem. The designs are excellent and well suited to the material, except in the use of sheet metal on the tower in imitation of marble. The street-light globes are too small and the traffic-signal standards should have provision for illumination of the shaft and should be provided with a more substantial base. The presentation is exceptionally fine.

The second prize of $600 was awarded to H. Roy Kelley, Los Angeles, Calif. The solution evolved by this author is successful in part only. The tower is picturesque and practicable. The signal standard would be more attractive if the cage for the lights had been shortened and widened. The lighting standards are generally weak in design, especially the lamps and supporting brackets. If the lower portion of all the standards

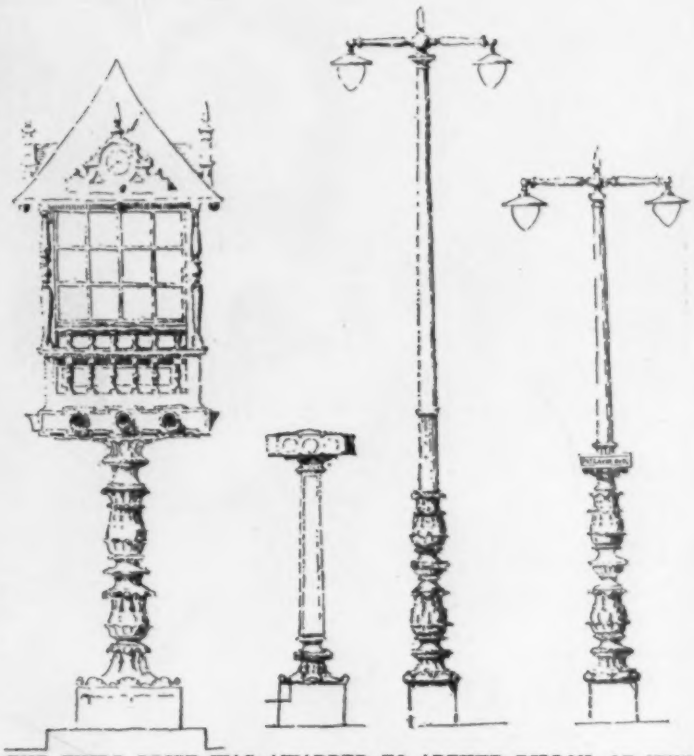


DESIGN FOR LIGHTING AND TRAFFIC CONTROL SCHEME FOR BISCAYNE BOULEVARD MIAMI FLORIDA

THIS DESIGN, BY S. GRILLO, OF NEW YORK, WAS AWARDED FIRST PRIZE

were treated similar to the boulevard lighting standard, the solution would have been more successful.

The third prize of $400 was awarded to Arthur Dillon, New York. In this drawing the Jury places the signal standard first in merit, the lighting standards second, and the tower third. The lower portions of the standards are good in design, but the lamps and their supports are lacking in interest. The tower is unfortunate and has very little merit. The signal standard is unique, very attractive, and thoroughly practical.

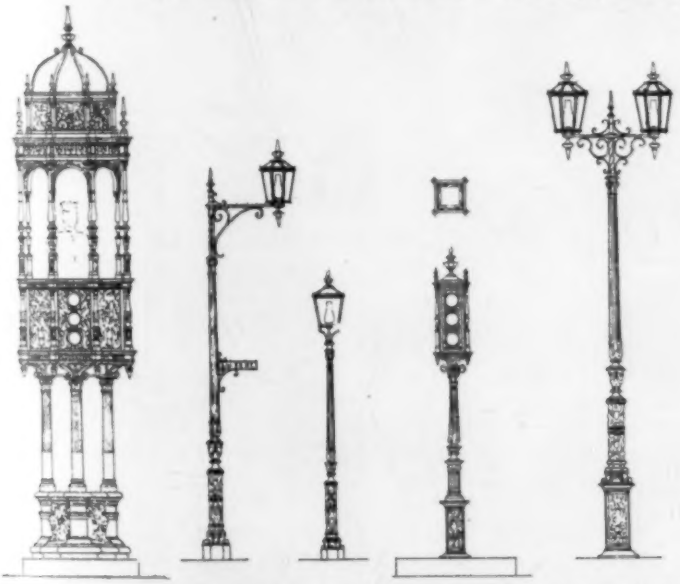


THE THIRD PRIZE WAS AWARDED TO ARTHUR DILLON, OF NEW YORK, FOR THIS DESIGN

Competition No. 2

The Jury was very much pleased with the manner in which the gas-station problem was approached. Many of the designs show much originality and study of the problem, which today is greatly in need of a solution. Streets throughout the entire country are littered by horrible examples of poorly designed or contractor-built filling stations, with no redeeming features except that of service to the motorist out of gas.

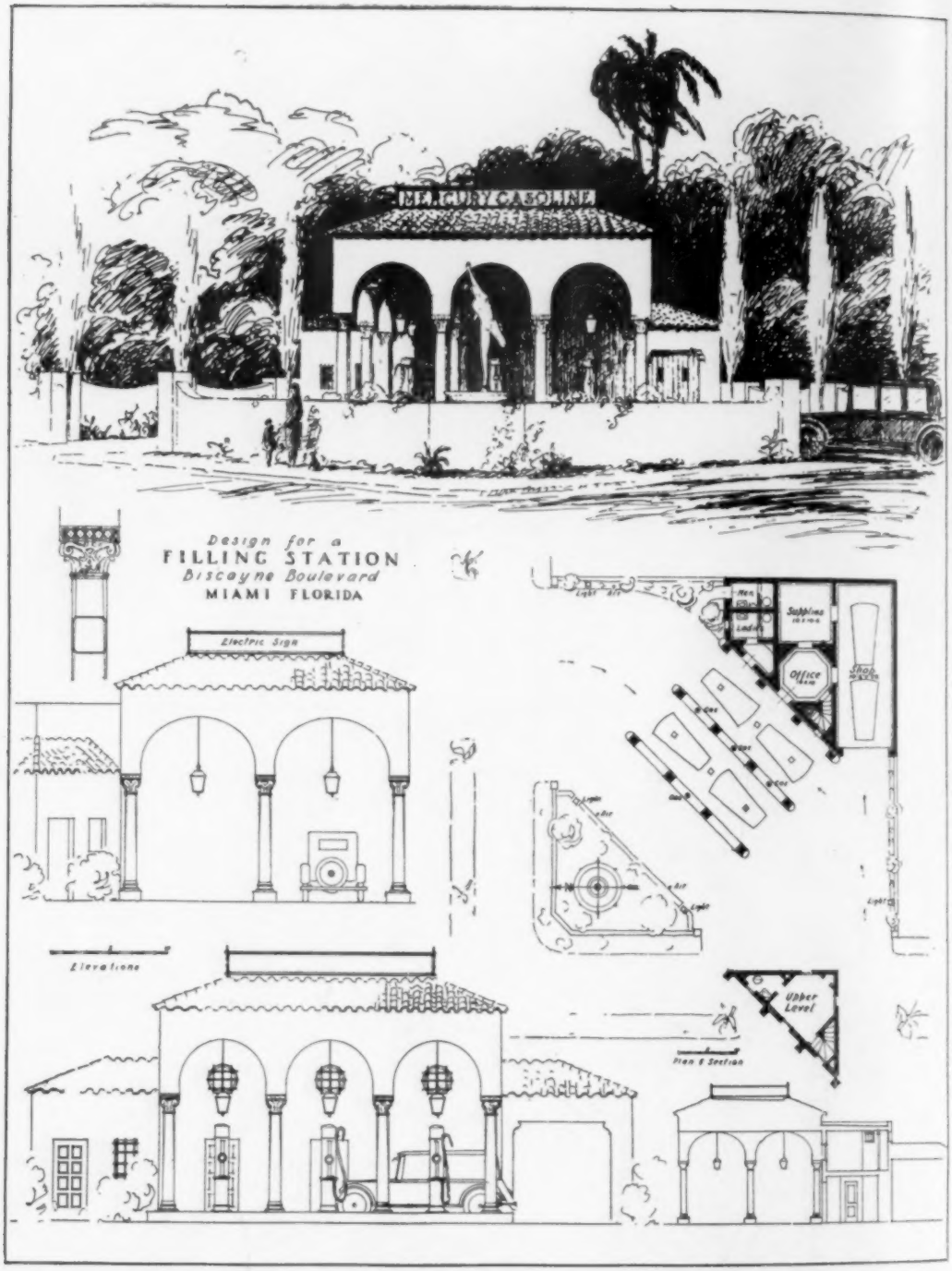
The first prize of $750 was awarded to H. Roy Kelley, Los Angeles, Calif., for the best solution of the problem. For both practical consideration and attractiveness, this design was the best submitted. It is a good treatment of a corner city lot. It is possible for three lines of cars to get service at the same time, and presents minimum interference for entrance and exit. The service lines are protected against bad weather by covered ways, and altogether it is an outstanding presentation. The Jury feels that this design properly detailed and executed would prove a practical solution of the problem and that it is a design which would attract both business and the appreciation of the public.



THE SECOND PRIZE WAS WON BY THIS DESIGN BY H. ROY KELLEY, OF LOS ANGELES

The second prize of $400 was awarded to Edgar Albright, New York, for an appropriate design for a city corner, where no assurance is had of what will be built on either side. The design is excellent in character, nearly equaling, in the mind of the Jury, the one awarded first prize. Of all submitted, it makes the best of the available land. It was also the leading design in the popular Spanish influence.

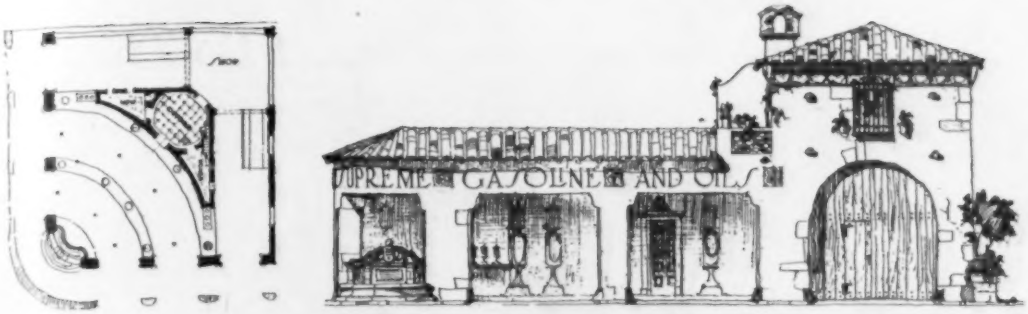
The third prize of $250 was awarded to John Donald Tuttle, New York. This design is especially good for a residential section. It is of



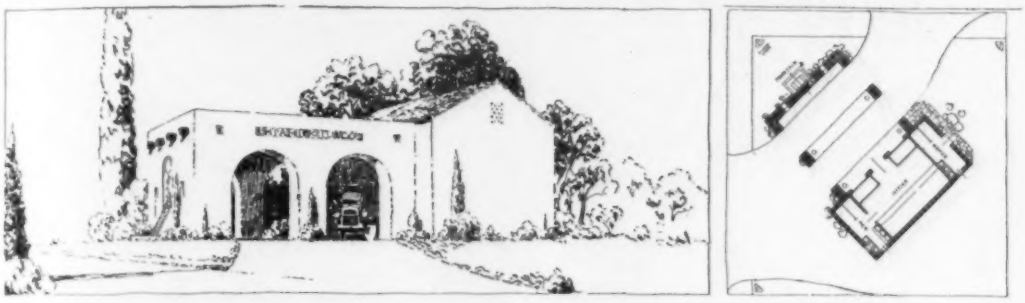
THE DESIGN THAT WON FIRST PRIZE IN THE GAS-STATION COMPETITION, BY H. ROY KELLEY, OF LOS ANGELES

simple character and good proportions and has real charm. It would require, however, interesting landscape planting to make the most of the design. The plan is good, but not carefully studied as to the practical requirements for oiling, storage of materials, etc. The design of the fountain is beautiful and if well detailed would make a very interesting feature and give a fine chance for the use of color.

The present condition of the Biscayne



THE SECOND-PRIZE DESIGN FOR A GASOLINE-STATION, BY EDGAR ALBRIGHT, OF NEW YORK



THE THIRD-PRIZE DESIGN, BY JOHN DONALD TUTTLE, OF NEW YORK

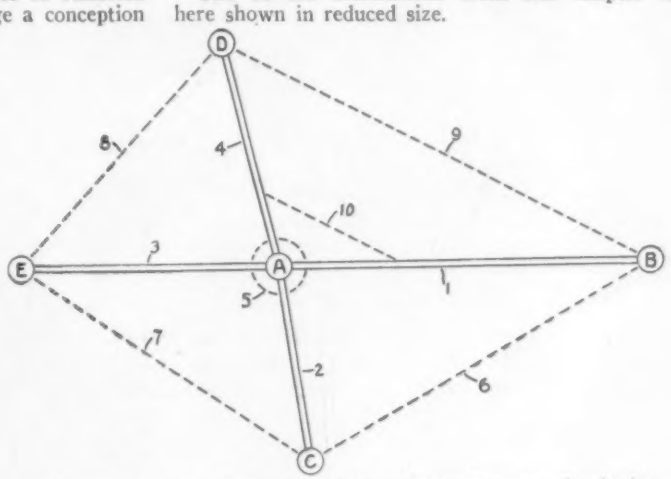
Boulevard may be seen in the airplane view of the bay-front section of Miami, taken last month, which is reproduced on the front cover of this issue of THE AMERICAN CITY. This view also shows, at the right, the new water-front park now in process of development.

Highway Planning for Relief of City Congestion

IN his new book, "A Nation Plan" (reviewed on page 889 of this issue), Cyrus Kehr points out the fact that, as an important by-product of his proposal, a plan for the coordinated physical development of the United States of America would present to the people at large a conception of the value and importance of planning and thus create such an interest and activity in city and other local planning as has not heretofore existed.

In the chapter on "Achievements to Be Expected from a Nation Plan," the relief of city congestion is especially emphasized: "By choosing new 'centers,' appropriately distributed, and by connecting all centers by means of the best communication lines, in accordance with the Nation Plan, the 'spreading' of mankind will be resumed and the tendency toward 'heaping up bigger cities' will be reduced. * * * The proper placing of that immense city population will indeed be of the greatest importance. Every possible effort should be made to limit the numbers to be added to the large and already congested cities and to add to the population of the areas which are now sparsely settled."

One of the illustrations from this chapter is here shown in reduced size.



Congestion in the city, *A*, in this diagram, can best be relieved by improvement remote from that city. 1, 2, 3 and 4 are highways. The streets in *A* are congested with highway vehicles going between the cities, *B* and *C*, *C* and *E*, *E* and *D*, *D* and *B*, *B* and *E*, and *C* and *D*.

A belt highway, 5, placed around *A* will divert this through traffic from *A*. But then this traffic will continue to burden the highways, 1, 2, 3 and 4. This can be remedied by building highways along the dotted lines, 6, 7, 8 and 9.

A highway on the dotted line, 10, would by pass *B* and *D* traffic.

The Decent Householder Doesn't Do This:

How Can the Decent City Continue to Do This:

Drawn for THE AMERICAN CITY *by MORRIS*

Planning and Establishing a Municipal Market

By C. C. Carpenter and I. B. Stafford
Syracuse University
Consultants to Cities on Marketing Problems

THE municipal markets of up-state New York cities are rapidly becoming of considerable importance in the business life of those cities. In Albany, Utica, Syracuse, Rochester, and Buffalo they constitute a very live civic question. All these cities have already spent or are contemplating spending considerable time and money in the improvement of their markets.

The amount of business done by these markets reaches a figure astounding to those who are not well acquainted with their activities. As an example of this, consider the figures found to apply to the Syracuse market after a careful and extended study of its business. In 1925 the total business was well in excess of $3,000,000. This is several times as much as estimated by a number of men who should have been in a position to know what the market was doing. But the figure is correct, having been obtained from a compilation of the sworn affidavits of the farmers using the facilities offered by the city for this purpose. During the same period the railroads importing perishable products to Syracuse brought in 2,858 carloads valued at $3,363,866. This figure was obtained by using a wholesale value of $1,177 per car, which was an average price on 450 cars received by a group of the most prominent wholesalers of the city. Present information seems to indicate that the municipal market business for 1926 will exceed that of 1925 by at least 50 per cent.

No city can afford to neglect any business of this magnitude, especially one which comes so directly under its control. The size of this type of business depends to a considerable extent upon the area of farm land within reach and the population which it feeds. It can be plainly seen that the city working with a careful plan for the future has a marked advantage over one which gives only sporadic attention to this important phase of its life.

The rapid development of municipal markets which has taken place within the last few years is due largely to three factors. The demand for cheap food during and immediately following the war seemed to find one solution in this manner. But more important has been the extension of good roads into rural districts, and the general motorization of the farmer. These latter developments have made it possible for him to bring his produce a longer distance in order to market it himself. At the present time over 90 per cent of the farmers coming to these markets are using some type of motor vehicle. When produce was mostly brought in by horse-drawn vehicles, the maximum distance from which it was profitable to come was only about fifteen miles, although some, of course, exceeded this. At present the average distance for the auto or truck is about twenty-five miles, and it is not uncommon to find producers of specialized crops such as fruit and poultry coming from as far as two hundred miles away.

Whenever a market is established or expanded, calling for more of the voters' money, the plea usually employed is that such a market enables the general public to buy food more cheaply. The question then arises as to

Public Markets Deserve More Consideration

A well-organized market is a self-supporting institution and in some cases pays very well for itself. It is one of the few such city enterprises, and while it should not be used by the city as a money-making scheme, it does deserve extra consideration because it is not a source of expense.

Chambers of commerce and similar organizations are overlooking an important item in the city's business if they do not insist that the market be adequately planned and supervised. The reason for this is quite plain—the business is a large one and a good percentage of the money received in the market is spent within the city.

These considerations are important, but we should not lose sight of the fact that the prime purpose and function of the market is to lower food costs to the consumer.

whether the general public utilizes the market. A study of market patrons shows that retail buying such as is done by the housewife is a comparatively small part of the total. Information at hand shows that in the markets in New York State 80 to 85 per cent of the buying is wholesale, such as is done by hucksters and retail grocers. However, this economic justification still remains, since the neighborhood grocer does his buying there as often as possible. This results in a saving to the consumer, as it has been found that shipped-in produce does not successfully compete with that brought to the market by the farmers.

Through the market the consumer has the opportunity to get fresher produce than otherwise. If purchase is made in the market itself, there is the chance to choose from a large assortment of goods seldom more than twenty-four hours from the field; while even though bought through the grocer, there is assurance that the produce has not had to stand the handling nor the lapse of time which rail shipments necessarily entail.

The food supply of a city is of vital importance to it. The spread between the farm and the consumer price of produce seems to be largely due to its handling in the city. Anything which would tend to reduce this merits attention, because we are all consumers when it is a question of food. The municipal market offers one way of decreasing this spread; consequently, every city having a municipal market or expecting to have one should give the subject very careful study. Such factors as location, layout, and administration have a great deal to do with the success of a market. However, the facts which make for or against a wise choice in these matters are seldom available to a city administrator unless brought to his attention after a thorough investigation of the needs of the city and its tributary producing region.

Development of a Complete Marketing Center

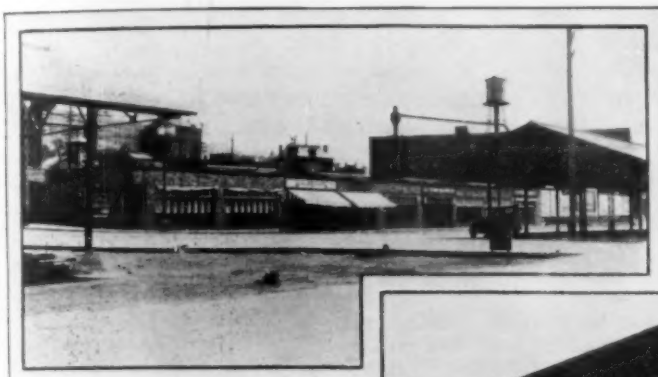
Most municipalities interested in marketing confine their expenditures to one phase of the subject—the farmers' market. Producers using the facilities offered by the city for this purpose do both a wholesale and a retail business. The tendency, however, is for all agencies concerned in the sale of perishables to concentrate about the farmers' market. This is especially true where the farmers' market is well established, and is simply a manifestation of economic law, which results in speeding up the business. These produce centers usually grow up without any real plan, and the result is frequently much congestion which could have been avoided by a study of the conditions. Since these businesses are inseparable from the farmers' market, it would seem that the entire scheme should be under the control of the city, at least in a general way.

There is apparently a limit of population to be served by such a market below which it would not be profitable to attempt the development of a complete marketing center. A compact area of 100,000 population would probably be the smallest unit for a project of this sort. On the other hand, there seems to be no existing concentration of population too great to be fed by a properly designed terminal market. Even New York City is experiencing great difficulty in trying to disperse its marketing centers. The multiple market idea in general has never been successfully worked out. Another factor to be considered beside that of population is the distance involved both for goods to be brought in and for those to be shipped out. Any state or federal organization having jurisdiction or acting in an advisory capacity should go very slowly in fostering the development of complete markets in cities which are close together. While some overlapping of the areas served is permissible and only natural, it can be easily overdone, the result being a competition which would result in increased food costs.

The specific location of a market in any particular city is a local problem which can be treated only in a very general way in a paper of this sort. The first and most important consideration should be that of area. This must be large enough to allow for all the agencies involved and for expansion as the business grows. In these days of rapid transportation, a distance of a few blocks or even a mile or two is of minor consideration as compared to the matter of ample space for proper development and for time consumed by a buyer in making up his load or for a producer in disposing of his. However, with these points in mind, it is advisable to locate the market as near the business district as possible. It should not be so placed that it will add greatly to the existing traffic problem. While it is of course necessary to have streets leading to it, there should be no cross-streets through it, and it should be separated from any other regular flow of traffic during the hours which it is in operation. From information at hand, an area of twenty acres would seem to be necessary for a complete market supplying a population of 100,000.

The central development would be the farmers' wholesale and retail markets. Adjacent to this should be the commission houses, with

railroad unload platforms at the rear. Provision would also be necessary for side-door delivery, storage tracks for shipped-in produce, and storage houses for produce of all kinds. Every complete market should also maintain an administration building, which could well include, besides the necessary offices, such other conveniences as comfort stations, lunch-rooms, check-rooms, a small inside market, and weigh-houses. Ample and conveniently located parking space must be provided for buyers, a feature which is often overlooked, although the buyer is plainly an essential part of the market.



AS IN THE VIEW ABOVE, THE FARMERS' MARKET AND THE COMMISSION HOUSES ARE ALWAYS FOUND TOGETHER

AT THE RIGHT IS SHOWN A SATISFACTORY TYPE OF SHED FOR A PUBLIC MARKET

The shape of the area deserves careful consideration. The long-drawn-out or "string bean" type is the poorest possible. The square shape is good, but probably a 3 x 5 or 5 x 9 rectangle would be better. Even a triangular market could be worked out satisfactorily. No area should be discarded simply because it is of irregular shape, unless that shape is a narrow strip. For the sake of efficiency the area ought to be level or nearly so.

Some sort of shed should be provided for from one-third to one-half of the maximum registration of producers. The simplest type of shed which gives weather protection to the load and the buyers is satisfactory. Big market days are usually in fair weather, and many farmers do not object to being in the open at such times; in fact, many prefer it, as it is apt to be colder under cover than out in the sun. The open type of shed shown in the illustration has proved satisfactory. This covers two rows of producers' loads and affords a wide selling aisle between them. This selling aisle ought to be at least 16 feet wide to allow free passage during the busiest hours. An improvement over the arrangement illustrated would be to have a 4-foot display platform raised from the aisle along each side. Between sheds ample room should be left for parking down the center, with one-way traffic on each side.

The particular location of each unit of the market depends to a large extent on local conditions, among which are the position on railroad lines leading to the market, important city traffic ways, direction toward the city, and other similar considerations.

Only One New York

Of the ten thousand or more places in the United States large enough to have a post office, more than half share their names with others. There are twenty-three Clevelands in as many states, six Philadelphias, twenty-eight Washingtons, twenty-six Madisons, twenty-five Lincolns, twelve Bostons, fourteen Atlantas, fourteen Newarks, two Chicagos, a score of Daytons, Lexingtons, and Cantons, but only one New York.

—*Municipal Reference Library Notes.*

Rational Distribution of Population Discussed at International Housing and Town Planning Congress

By Harlean James

Executive Secretary, Federated Societies on Planning and Parks

THE International Housing and Town Planning Congress at Vienna was conducted in the English, French, and German languages. The principal papers were published in two volumes distributed before the Congress, each paper in one of three languages with a resumé in the other two. The program which was presented verbally was conducted without translation and consisted of discussion of the printed papers. The speakers chose one of the three languages in which they were most fluent and the listeners followed as best they could. While many of the delegates had a reading knowledge of all three languages, many more did not. Even those who spoke rather precisely found it difficult to understand fine distinctions of other speakers.

It is apparent that unless and until the International Housing and Town Planning Congresses induce greater linguistic fluency on the part of the delegates it will be necessary to resort to verbal translations from the platform if the delegates are to follow the proceedings in that detail which is essential for the interchange of precise ideas.

The program covered two main subjects: (1) land tenure and town and regional planning; and (2) rational distribution of cottages and tenements.

Height, Zoning and City-owned Land

In Vienna, where the Congress was held, two main remedies have been applied to safeguard the city from land speculation. They are the restriction of the density of population through a system of zoning, and the public acquisition of land. Vienna was already making a building zone plan in the eighties and nineties by which the height of buildings was limited and under which, in very large areas, only detached houses, of not more than three stories, including the ground floor, were permitted.

In the last ten years the city of Vienna has acquired nearly 7,000 hectares, or about one-quarter of the whole area of the town. The reports of many other European cities indicate that the municipality is a considerable landowner. The argument is made that not only is the city thus able to stabilize land values but that it often holds in ownership land which later is assigned for housing, schools, baths, playgrounds, and other purposes, without submitting to the lengthy process of acquiring land for these specific purposes at prices which have been set by private landowners.

The Largest Meeting of Its Kind Yet Held

On the 14th day of September, 1926, there assembled at Vienna nearly 1,200 delegates in attendance at the largest international housing and town planning congress yet held. Nearly 300 came from 60 cities of Germany, over 60 from Austria, 75 from England, 40 from Czecho-Slovakia, 28 from the United States, 28 from Poland, and 25 from Holland. There were delegations also from Sweden, Switzerland, France, Belgium, Spain, Italy, Denmark, Hungary, Rumania, Jugo-Slavia, Scotland, Bulgaria, Greece, Lettland, Russia, Finland, Australia and Uruguay.

Private Open Spaces

A number of the Continental municipalities are making use of regional zoning to provide extensive open spaces in the outskirts of crowded cities. Certain lands are zoned as "agricultural" and are not permitted to be used for housing purposes. The taxes on these agricultural lands are low enough to form an inducement to owners to keep the land in agricultural use. In the last fifteen years in Europe there has been little speculative building. During the war the building of houses practically ceased. Since the war housing has been erected mainly through government aid, either by municipalities with state subsidy, or by building companies with state and city subsidy, or by private individuals who have qualified in some way for some sort of subsidy. This has made it comparatively easy to control the areas chosen for subdivision.

Housing

In the papers presented to the Congress a good deal of space was given to the various plans by which the states and the cities subsidize housing.

An inspection of scores of housing schemes in England and on the Continent discloses the fact that the physical arrangements in the different countries were designed to meet living customs quite different from those we know in America. There is very little which can be copied in the actual house plans. The garden city idea has influenced very generally the housing schemes of England and, to some extent, on the Continent, particularly in Holland. A certain monotony of design and material is greatly modified by cultivated garden spaces.

The German Tour

Following the Congress at Vienna, a ten-day tour of German cities brought the delegates to the Congress in contact with the charm of an older civilization. The policy of protecting the picturesque buildings of the Middle Ages is very generally followed. In Prague maps have been prepared marking "protected buildings" in red. Not all protected buildings are old. The new Wilson Station is a protected building, and no city planning scheme would be permitted to harm this building; but most of the protected buildings are those which have come down from former generations. A model of the old castle on the hill and its surroundings is kept at the City Hall in order that no building may be erected in any part of the town which will destroy certain vistas of this dominating scene.

On the German tour the American delegates could not but feel impressed with the architectural and landscape development of the riverfronts, even when the waters were used for commercial traffic. The bridges, both foot and wheel, were ordinarily well designed.

While the old quarters of the ancient towns are being preserved, excellent arterial street systems are being developed for the newer parts of the town. Open squares, inner and outer park systems, public control of river frontages, all united to provide easily accessible facilities for outdoor recreation.

International Congress

While delegates from so many countries, speaking diverse languages, undoubtedly have much to learn in developing the technique of future Congresses in order to render the greatest service, it must be admitted that no one could have attended the International Housing and Town Planning Congress at Vienna and participated in the tour afterwards without having gained a wider vision of town planning and housing from the contact with the delegates from other countries. There was a spirit of public service, a willingness to learn, and a desire to share successful experiments with all who were there.

To the delegates who came from young America the inspection of the old cities of middle Europe could not fail to prove inspiring.

The officers of the Congress, the officials who made the Vienna arrangements, and the German Garden City Association, which planned the German tour, are all to be congratulated on the opportunities for international contacts and exchange of ideas which they made possible for the delegates to the 1926 Congress.

Five Acres or More for School Sites

AT the last National Conference on City Planning held in Florida in April, 1926, there was reported a trend toward the acquisition of larger sites for schools. To discover the facts, the Conference, in the summer of 1926, sent to the cities of the United States which have a population of 15,000 and over—about 500 in number—an inquiry as to the size of school sites acquired in the last ten years. Up to October 10, 270 cities had replied, of which only 15 had a population of 150,000 or over. From the mass of information received, the following conclusions can fairly be made:

Five acres or more for elementary schools, and 10 acres or more for high schools, whether junior or senior, have been acquired by several cities in each of the following states: California, Georgia, Indiana, Michigan, Minnesota, Ohio, North Carolina, Pennsylvania, Texas, and Wisconsin.

Sixty cities definitely report either a policy of securing for elementary schools 5 acres or more and for high schools 10 acres or more, or that the acreage secured indicates such a policy.

The smaller cities, as might be expected, make the best showing. They still have large unbuilt-upon areas which can be secured at reasonable prices.

Most of the cities reporting gave also the cost to acquire the land. For elementary schools the range was from $500 an acre to $4,000, but there were instances in the smaller cities where the price per acre was much higher, from $8,000 to as high as $18,000, and in Chicago, as high as $30,000 per acre. The range for junior high school sites was from $1,000 to $7,000 per acre. There were three

instances where prices exceeded $7,000 in smaller cities, and Chicago paid $15,000 an acre for one of its junior high school sites. The range for high school sites was also from $1,000 to $7,000 per acre. There were two instances in the smaller cities where the price per acre was $15,000. Columbus, Ohio, paid $29,000.

The total acreage for schools acquired since 1915 is striking in several cities of 100,000 population and under. Flint, Mich., and Gary, Ind., lead with 274 acres and 188 acres, respectively, but the 90 acres of San Bernardino, Calif., a city of 20,000 population, are even more impressive. Using the increase in population from 1910 to 1920 as a basis, it appears that at least twenty of the smaller cities in the country have acquired for every 1,000 increase in population from 2½ to 8 acres of land to take care of school needs. The figures for San Bernardino, Calif., and Wausau, Wis., are exceptional, with 15 acres and 17 acres per 1,000 increase in population, respectively.

These facts are of great significance to city planners who are urging on the cities of the country a program which shall result in:

a. Fairer distribution of open areas throughout the built-up portion of the city.

b. Such a control over the subdivision of large unbuilt areas as will result in the setting aside of a portion for neighborhood open spaces.

c. The creation of a belt of open land on the fringes of cities. Some of this will be in private ownership, that is, large estates, golf and country clubs, farms, some in public reservations, as water-supply areas, municipal forests, large parks.

Schools are, or should be, distributed on the basis of population, and it is logical to have in the site area enough for playgrounds at the elementary school, and at the high school for playground and athletic fields. If these areas are large enough to provide in addition for neighborhood parks, one of the aims of the city planner, namely, better distribution of city open spaces, is in the way of being reached. Moreover, if high-school sites can be placed not in the center where land is expensive, but at the edges where it is relatively cheap, then the open-belt ideal of the city planner will receive practical support. The information on which this bulletin is based can hardly be said to point to a trend in this direction, but several cities report that their new high schools are being taken out of the center.

The distribution of open areas and the best use of these areas, whether for playgrounds or for parks, can be settled only when park boards and school boards work together.

Road Construction and Maintenance in Walla Walla, Wash.

AFTER having had considerable experience with a large tractor in the construction and maintenance of its earth roads, and finding that its cost was $1,500 more than that of the Fordson later purchased and that it was more expensive to maintain, the city of Walla Walla, Wash., purchased a Fordson equipped with Trackson Full-Crawlers and used it with a Russell grader for road construction and maintenance. According to the latest reports from city officials, it cost the city $3 less per 10-hour working day to operate the Fordson than the former equipment.

With the Trackson-Fordson it is possible to cover twice the ground which would be covered with teams, because it can be operated at speeds from 1½ to 18 miles per hour. The unit has the additional advantage of an extra ton of weight, which makes this tractor a 2-ton proposition with a light ground pressure of only 3¾ pounds per square foot.

GRADING STREETS OF WALLA WALLA, WASH., WITH RUSSELL GRADER AND TRACKSON-FORDSON

Compulsory Military Training

A Movement to Abolish It from High Schools and Colleges

TO inquire into the status of military training in the educational institutions of Massachusetts and to urge the abolition of compulsory military training from the high schools and colleges of the state, are the objects of the Massachusetts Committee on Militarism in Education, which has recently published in pamphlet form a significant report on "Military Training in the Schools and Colleges of Massachusetts."

Summarizing the facts disclosed by its survey, the Committee says:

"Some 16,700 boys in Massachusetts — 12 to 19 years of age—take military drill as part of their public school curriculum.

"Massachusetts stands *first* in the number of public school boys taking such drill —with over twice the number of any other state. California is second with a total of less than 8,000.

"Military drill is offered in 23 high schools in this state. It is *compulsory*—in one form or another—in 18.

"Two cities maintain a Junior Reserve Officers' Training Corps for boys 14 years and over. In one, training to become a reserve officer in the United States Army is a prerequisite for graduation from high school.

"Four colleges maintain a Senior Reserve Officers' Training Corps. Two of these make military training compulsory for two years upon all male students.

"The War Department plans to extend military training—*compulsory where possible*—into every school and college of importance in the state."

The attitude of the Committee toward compulsory military training in the high schools and colleges is indicated in the following paragraphs from the foreword and conclusions of the pamphlet:*

"We are living in days so near the Great War that its passions and hot partisanships are not yet dead. Thus it is that certain topics relating to our national policies are extremely difficult of sano and ordered consideration. One of these is the problem of military training.

"This Committee desires at the outset to recognize the sincerity of those with whom it differs in the matter of military training. It realizes particularly that many splendid men are engaged in teaching military science in schools and colleges and that it is far from their purpose to inculcate in pupils a lust for war. It knows that members of the War Department and Army Officers who advocate compulsory military training for all boys do so from the firm conviction that this is the best way to keep our country out of war. Here, in other words, is a question of policy on which honest people differ.

"The Committee itself is composed of citizens of many, often opposing, views as to the proper extent of military preparedness, who are agreed in the desire to see this country continue the traditions of justice, freedom and democracy which are at the base of our national greatness. One great element of our national tradition is our love of peace. The youth of today must be educated for peace if peace is to endure. The policies of our nation tomorrow are in their hands.

"The way of peace is not easy nor simple. There are dangers from without and within, and we would be dwelling in a fool's paradise to claim that all men of this or any other nation are motivated by considerations of justice and good-will. Just how proper preparation should be made by our country to meet the danger of war is a question upon which this Committee is divided. This is a question which it does not seek to settle. One thing unites its members. They all agree that the building up of a huge war machine on the basis of compulsory military training would make for war and not for peace. Such military and naval establishments were the expressions of the fears and conflicts of the European nations and played a large part in bringing on the Great War. It is because our preparedness program is developing features dangerously akin to the militarism we enlisted to fight in 1917 that this pamphlet is sent forth. Today to an extent that most of us have never dreamed of, military training is being forced upon our young men in high school and college. Other large numbers, encouraged by the War Department, are voluntarily undertaking military training. That is to say, in this country large and increasing numbers of our students, the potential

President Coolidge

in his address at the American Legion Convention in Omaha, October 6, 1925, said:

"We are conscious that no other nation harbors any design to put us in jeopardy. It is our purpose in our intercourse with foreign powers to rely not on the strength of our fleets and our armies, but on the justice of our cause."

Raymond B. Fosdick

Chairman of the Commission on Training Camp Activities during the War, in a recent statement to the Committee on Militarism in Education, sums it up:

"I believe military training is a vicious institution and that under the pretext of healthy drill and physical education we are stimulating a revival of the same distorted nationalism that was responsible for the catastrophe of 1914, and perpetuating a system of organized hatreds which, unless checked, may spell the end of our civilization. This new recrudescence of militarism in the United States is sheer madness."

* The complete report is obtainable from the Massachusetts Committee on Militarism in Education, 14 Beacon Street, Boston.

leaders of tomorrow, are being trained for war in such fashion that they accept the inevitability of conflict.

"Accompanying this tremendous increase in military education we find no evidence of any adequate instruction in 'American principles,' little instruction as to the causes of war, the part played by the foreign policy of a nation in bringing on the occasion for conflict, little instruction in regard to our own foreign policies, our own wars, and the united efforts of many kinds now being made to eliminate the causes of war and to ensure the peaceful settlement of international disputes. We are doing little or nothing, in other words, to offset the militarization of the mind of our youth!

"The spirit of scientific education and the spirit of militarism are in direct conflict. A disinterested search for truth regardless of authority is not in agreement with blind obedience regardless of truth or right.

"The moral needs of the age require a building up of authority within the individual—not a breaking down of the will, but a strengthening of the will. Young men suffer today because they conform to a popular demand, because they follow the stream of group thought and action, because they yield the better inner personal ideals to external pressure. The best fortification against this weakness is not found in mass drill and enforced conformity based on external coercion, but is found in the building up of the inner defenses of the soul, in the strengthening of the individual to stand alone against temptation in spite of popular custom and clamor.

"Training young men for war is not the best way to bring peace. The men who gave their lives in the war to end wars will have died in vain if the nations of the world enforce military training upon all young men. It is thus that international distrust and competition are developed, rather than international good-will and cooperation.

"The difficulty with military training is not so much any specific thing which the pupil learns, but the general training it gives in the psychology of war. It leads youth to take war for granted. It tends to breed in his immature and receptive mind a lasting suspicion of other nations, which, viewing such unwonted preparations in the United States, in their turn conceive their own suspicions. Again the vicious circle.

"Were this merely a question of military drill, as most men recall it from their own high school days, it would be one thing. We have here, however, a frank proposal to extend military training, compulsory so far as possible, and under the management and control of the War Department, to public schools and colleges throughout the United States. This at a time when, perhaps in all world history, it is most important to avoid stimulating the war spirit!

"Educators generally agree that military drill in schools performs no really useful function. Compulsory military training in colleges is based partly on a misinterpretation of law, partly on a false conception of values and generally on a failure to realize what it eventually involves. The plans of the War Department for a further extension of compulsory military training is un-American and entirely out of keeping with the times.

"Under these circumstances, bearing in mind that the United States, in the opinion of competent experts, has nothing to fear from foreign aggression, and realizing that no European country introduced military training into its public schools before the war, those who believe that the settlement of international disputes should be contrived through the promotion of good-will and the establishment of machinery like the World Court, must strive to stem the growth of militarism in this country. If they cannot do so they may as well despair of international cooperation which alone can end war."

Citing as distinctly encouraging the action of the authorities of Boston University in abolishing compulsory military training, and of the Massachusetts high school principals who at their 1923 State Conference recorded their unqualified opposition to military drill for school boys by an overwhelming vote of approximately 150 to 9, the Committee expresses the hope that these actions mark the beginning of a concerted effort to abolish compulsory military training from every public school and college in Massachusetts.

Typhoid Patient Wins Suit Against City of Albany, N. Y.

A SUIT brought by John Weisner against the city of Albany in behalf of one of his sons who is said to have contracted typhoid fever from drinking polluted city water in the spring of 1924, and to have suffered permanent injury to his health thereby, was decided in favor of the plaintiff in the Supreme Court at Albany on October 26 by a jury which awarded damages in the sum of $3,000, $2,000 of which is given to the son and $1,000 to the father. This was a second trial of the action, the first, brought last spring, having resulted in a disagreement. Counsel for the city announced that an appeal would probably be taken to the Court of Appeals if necessary.

Counsel for the plaintiff based the case on the theory that the city contracts with each city to furnish water free from pollution, and that the city was negligent in failing to give timely and sufficient warning to the people of such pollution.

Of approximately 200 cases of typhoid fever which occurred at about the same time, 13 filed notice of suit within the required period and now have right of action.

Traffic Count Helps Boston Planning

By Elisabeth M. Herlihy

Secretary, The City Planning Board, Boston

A COUNT of passenger and vehicular traffic entering and leaving downtown Boston between 8 a. m. and 6 p. m. on Thursday, July 1, made by the Boston City Planning Board in cooperation with the Boston Chamber of Commerce, has been already used in several instances as a determining factor in both public and private developments.

Comparison with a similar vehicular traffic count taken by the Boston Chamber of Commerce two years ago shows an increase of more than 21 per cent—from 139,014 in 1924 to 169,520 in 1926—in the total number of vehicles passing over the highways, bridges, and ferries which lead to and from the Boston central district.

The heaviest increase, 29 per cent, was in passenger cars; trucks came next with an increase of 21½ per cent; while horse-drawn vehicles showed a decrease of 21½ per cent. The similarity of the last two percentages offers a strong temptation to jump at the conclusion that horses had been merely replaced by motor vehicles, but as a matter of fact they must be accepted as a coincidence only, since the basic figures are widely different. The 1926 count also showed that 64½ per cent of all vehicles entering the downtown district were passenger cars, 29 per cent trucks, and 6½ per cent horse-drawn vehicles.

Another interesting tabulation showed that the eight bridges which connect downtown Boston with South Boston, Charlestown, and Cambridge now handle 49 per cent of the total traffic, or only a fraction of a per cent less than the traffic which uses the fifteen highways that connect with the south and west, leaving the ferries to carry the remaining 2 per cent.

To the casual observer it would appear that the volume of traffic at certain points showed an exceedingly marked increase, whereas an explanation is to be readily found in local conditions. For instance, traffic passing over Cambridge Bridge to Cambridge Street shows an increase of 124 per cent in two years, or from 6,454 to 14,438. This may be accounted for by the fact that Cambridge Street in the meantime was doubled in width and, although not entirely constructed, was open for traffic purposes. Mount Vernon Street, although carrying a relatively small volume of traffic, showed the next largest increase, or 122 per cent. This may be accounted for largely by the fact that it has been called upon to carry a portion of the traffic formerly borne by Beacon Street, which it parallels and from which heavy trucks have recently been excluded. Other street improvements, changes in traffic regulations, and new building construction are all reflected in the total figures.

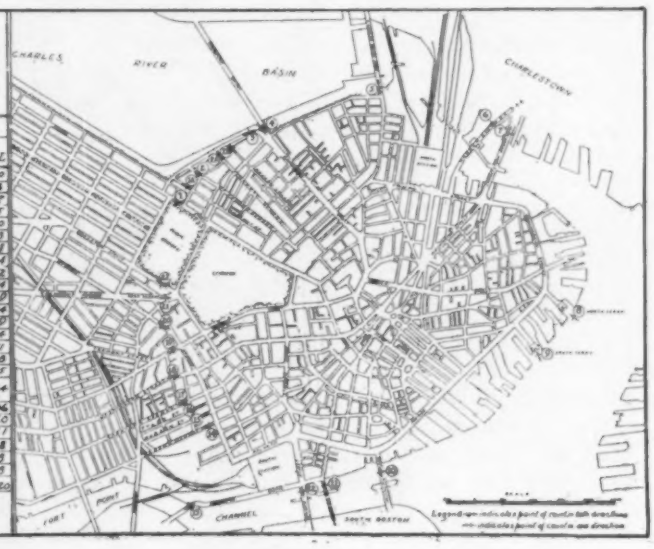
The vehicular count as a whole shows a steady normal increase in the use of the streets of the city. Nothing radical was anticipated or discovered. The detailed tabulations which make up the count indicate clearly the problems which must be faced of amending the

COMPARATIVE COUNTS OF VEHICULAR TRAFFIC ENTERING AND LEAVING DOWNTOWN BOSTON 8 A.M. TO 6 P.M. JULY 1, 1924 & JULY 1, 1926

MADE BY THE BOSTON CITY PLANNING BOARD AND THE BOSTON CHAMBER OF COMMERCE

LOCATION OF TRAFFIC COUNTS IN 1924 AND 1926	JULY 1-1924 DIRECTION IN	OUT	TOTAL	JULY 1-1926 DIRECTION IN	OUT	TOTAL
1. BEACON STREET	7551	2764	13315	8132	5218	13450
1A. CHESTNUT STREET	"	"	"	115	221	336
1. MT. VERNON STREET	138	870	1028	518	1769	2287
2A. PINCKNEY STREET	"	"	"	130	175	305
2B. RIVERE STREET	"	"	"	62	178	240
2. EMBANKMENT ROAD	2116	2755	4871	3197	4316	7513
3. CAMBRIDGE BRIDGE	3480	3174	6654	6721	7717	14438
4. CRAIGIE BRIDGE	4334	3962	8296	5584	5834	11418
5. WARREN BRIDGE	4117	4782	8899	5002	4550	9552
6. CHARLESTOWN BRIDGE	5943	6940	12883	7306	9246	16552
7. NORTH FERRY	956	1074	2030	609	740	1349
8. SOUTH FERRY	534	578	1112	1011	1043	2054
9. NORTHERN AVE BRIDGE	2678	2691	5369	2538	2821	5359
10. CONGRESS ST BRIDGE	1960	1459	3419	2482	1802	4284
11. SUMMER ST BRIDGE	4190	4533	8723	4852	4799	9651
12. DORCHESTER AVENUE	4486	4857	9343	5945	5260	11205
13. ALBANY STREET	080	2820	2820	080	3075	3075
14. HUDSON STREET	2622	180	2622	3004	180	3004
15. TYLER STREET	"	"	"	"	"	"
16. HARRISON AVENUE	1832	2648	4173	1905	4051	6036
17. WASHINGTON STREET	1587	594	2181	1940	590	2560
18. TREMONT STREET	4707	3286	7993	4002	3772	7861
19. STUART STREET	6764	5851	12615	5917	5911	11308
20. PARK SQUARE	4683	4532	9215	5055	4263	9318
21. BOYLSTON STREET	6035	5903	11938	7461	7697	15158
Total	79820	69194	139014	89384	80136	169520

NOTE: COUNTS INCLUDE PASSENGER AUTOMOBILES, MOTOR TRUCKS AND HORSE-DRAWN VEHICLES. " NO COUNT. IBO INBOUND ONLY. OBO OUTBOUND ONLY.



COUNT OF
PASSENGER TRAFFIC ENTERING AND LEAVING DOWN TOWN BOSTON
BETWEEN 8 AM AND 6 PM THURSDAY JULY 1 1926
MADE BY THE BOSTON CITY PLANNING BOARD AND THE BOSTON CHAMBER OF COMMERCE
639948
Passengers transported via street railways Boston Elevated Railway and Eastern Massachusetts Street Railway
Passengers transported via automobiles An estimated average of 3.0 persons per car
Passengers transported on railroads New York New Haven & Hartford R.R. Boston & Albany R.R. Boston & Maine R.R. and Boston Revere Beach & Lynn R.R.
16,500
Passengers transported via Ferries and Steamboats East Boston Municipal Ferries and Nantasket Beach Steamboat Co.
Total 1,034,588 Totals based upon actual traffic counts and upon figures furnished through the courtesy of the transportation agencies
7-31-26 YAK

physical plan of the city so as to meet the requirement of its citizens.

Street Railway and Bus Lines Carried More Than 60 Per Cent of Passenger Traffic

The passenger traffic count taken on the same day and during the same hourly periods showed a total of 1,034,588 persons transported into and out of the Boston central district by street railways, automobiles, railroads, ferries, and steamboats.

As was to be expected, a majority of this number, or more than 60 per cent, were transported via street-railway and motor-bus lines. A much smaller percentage, or a little less than 20 per cent, were transported via automobiles. Viewed from the point of the congestion existing in the downtown district, this percentage may seem comparatively small, but it must be kept in mind that each car carried an average of only 1.8 persons. This means that more than 100,000 passenger cars passed in and out of the city during the hours of the count.

No attempt was made to count or estimate the number of people who walked from nearby residential sections. This figure, however, is by no means negligible, since Boston with its Beacon Hill and Back Bay district, its North, South, and West Ends, Charlestown, South Boston, and portions of Roxbury, afford living opportunities in sufficiently close proximity to the business section to permit of walking on the part of thousands of its daily population.

Coincident with the publication of the results of the traffic count went forth the rumor that a dead line was to be established well on the outskirts of the heart of the city, and that beyond that dead line no vehicles would be permitted except those actually necessary for the transaction of business. Although it is possible that the time may come when some such drastic action may be found necessary, it should be taken only as a last resort and when every other possible alternative has been exhausted. For the present it may fairly be assumed that the streets of the city are for the benefit and convenience of the people of the city. As well refuse to lend books from the Public Library, close the doors of our school buildings or wall up our parks and playgrounds. They are all public functions, paid for out of public money, and should be available for publice use.

For Constructive Rather Than Prohibitive Planning

Of course, regulations are necessary in all public activities; but when the physical plan of the city, be it streets, schools, library, or recreational facilities, properly applied, does not meet the requirements of a community, then every effort should be made to amend that plan so far as possible in a constructive rather than a prohibitive sense.

A statement from one of the foremost authorities from New York is before me as I write:

"Many causes other than high buildings affect street congestion. . . . . Boston without high buildings has greater street congestion than New York with its high buildings."

The cure can be found only in a scientific study and anlysis of all the factors that tend to produce congestion, including high buildings, narrow streets, and parking violations, and in the development of a plan which, taking into consideration all these contributory causes, shall have for its sole objective the welfare of the city as reflected in the comfort, convenience, and prosperity of its citizens.

How the States Are Working Towards a Uniform Motor Vehicle Code

By A. B. Barber

Director, National Conference on Street and Highway Safety

THERE is now available in pamphlet form the final text of a proposed Uniform Vehicle Code, as approved by the National Conference on Street and Highway Safety in March last, and with modifications authorized and directed by the Conference. In its final form the code has been reviewed and endorsed by the National Conference of Commissioners on Uniform State Laws and the American Bar Association. A foreword by Secretary Herbert Hoover outlines the purposes and importance of such legislation.

To facilitate legislative consideration, the Vehicle Code has been divided into four separate acts:

(a) A Uniform Motor Vehicle Registration Act
(b) A Uniform Motor Vehicle Anti-Theft Act
(c) A Uniform Motor Vehicle Operators' and Chauffeurs' License Act
(d) A Uniform Act Regulating the Operation of Vehicles on Highways

Urgency of Prompt Action

Action in behalf of uniform vehicle legislation is of special importance at this time, because the Legislatures of forty-four states will meet in 1927 and only nine in 1928, so that if action is not taken at the coming sessions, it will, in most of the states, be delayed at least two years.

The continuance of the high accident record, and particularly the appalling increase in fatalities which has occurred during the past summer in many of the states, shows the urgency of the matter. It is hoped that all who wish to cooperate in behalf of such legislation will feel free to call on the National Conference on Street and Highway Safety, Department of Commerce, Washington, D. C., for copies of the Uniform Vehicle Code, the several reports of the Conference, or other information desired.

In many places alternative paragraphs are given, while portions of the text which may be omitted or changed to suit local conditions without impairing the acts from the point of view of uniformity are enclosed in brackets. Definite provisions to be recommended on such points and any modification necessary to meet constitutional or other legal requirements of a particular state will evidently require careful study. In many states this is being undertaken before the Legislature convenes, so that definite proposals may be made.

At the conclusion of the Conference on Street and Highway Safety last March it was unanimously voted that the delegates from each state should serve as an organization committee with a view to promoting the adoption of the Conference recommendations in that state.

We have received information as to activities in furtherance of the Conference recommendations in many of the states. A summary of this information follows:

Summary of State Activities

ALABAMA: *Legislature meets Jan.* 11, 1927

A state conference on street and highway safety will be held in December. A committee composed of members of the Alabama Automotive Trade Association, Alabama Motorists Association, and Birmingham Safety Council has been organized for the purpose of presenting the Uniform Motor Vehicle Code in its final form to the State Legislature. Perkins J. Pruitt, Director of the Birmingham Safety Council, is in charge of the work. He is furnishing state senators and representatives, county sheriffs, probate judges, mayors of cities, and city commissioners with copies of the Code in preparation for the December conference.

ARIZONA: *Legislature meets Jan.* 10, 1927

No special state activities with a view to securing new motor vehicle legislation have been reported.

ARKANSAS: *Legislature meets Jan.* 10, 1927

The situation in Arkansas is similar to that of Arizona.

CALIFORNIA: *Legislature meets Jan.* 3, 1927

A state-wide conference is contemplated for December with a view to considering new state legislation. A state conference has already been held at which a proposed Uniform Traffic Ordi-

nance for California cities, submitted by the Automobile Club of Southern California, was adopted. This proposed ordinance is in harmony with the Uniform Vehicle Code.

COLORADO: *Legislature meets Jan. 5, 1927*

The State Highway Engineer has reported that motor vehicle legislation will be suggested with a view to securing the passage of some law that may be consistent and uniform with those of adjacent states. As in California and Michigan, a proposed Uniform Traffic Ordinance for cities has been developed. The work has been carried on by the Colorado Municipal League.

CONNECTICUT: *Legislature meets Jan. 5, 1927*

It is expected that proposals in connection with possible new legislation will be considered in the near future by a meeting of the official state delegates who attended the National Conference on Street and Highway Safety. The Travelers Insurance Company has been broadcasting radio talks in support of the program of the National Conference on Street and Highway Safety.

DELAWARE: *Legislature meets Jan. 4, 1927*

At the call of the Governor of Delaware a state conference on street and highway safety was held in Dover November 12. The Governor was Honorary Chairman. Carlton T. Bingham of Wilmington, Del., was Director, and Walter Dent Smith, Manager of the Delaware Safety Council, Dupont Building, Wilmington, was Secretary of the Conference and in charge of arrangements.

FLORIDA: *Legislature meets April 8, 1927*

The Florida Automobile Association at its twelfth annual meeting endorsed the recommendations of the National Conference on Street and Highway Safety and appointed a Legislative Committee with Ex-Senator William Igua as Chairman, for the purpose of drafting a law to carry out the Conference recommendations for presentation to the next Legislature.

GEORGIA: *Legislature meets June 22, 1927*

A state conference on Street and Highway Safety was called by the Governor for October 12 and 13. Reports indicate that it was a very successful meeting. A second conference will be held in Atlanta in December.

IDAHO: *Legislature meets Jan. 3, 1927*

No reports have been received of any activities with a view to new legislation.

ILLINOIS: *Legislature meets Jan. 5, 1927*

The Illinois delegates to the Second National Conference on Street and Highway Safety met April 14, 1926, and organized a permanent committee with Sheldon Clark, Vice-President of the Sinclair Refining Company, Chicago, as Chairman, and Sidney J. Williams, of the National Safety Council, Chicago, as Secretary. This committee is to prepare legislation for presentation to the next session of the Legislature.

INDIANA: *Legislature meets Jan. 6, 1927*

A state conference on Street and Highway Safety was held in Indianapolis on October 12 and 13 with a view to laying the groundwork for legislation in harmony with the Uniform Vehicle Code.

IOWA: *Legislature meets Jan. 10, 1927*

W. M. Colladay, Superintendent of the Motor Vehicle Department, is Secretary of an organization consisting of the Secretaries of State and Motor Vehicle Registrars of Wisconsin, Minnesota, North Dakota, South Dakota, Wyoming and Iowa. A meeting of this organization was held October 29, at which the Uniform Code was discussed. A state conference to be called by the Governor is reported to be under consideration.

KANSAS: *Legislature meets Jan. 11, 1927*

A state safety council has been organized in Kansas, and James Greenleaf, a member of the State Utilities Commission, has been elected President. A state-wide conference called by the Governor and attended by 460 people was held September 9-10. The principal objective of this safety council is to promote the adoption of the Uniform Code.

KENTUCKY: *Legislature meets Jan. 3, 1928*

It is reported that little has been done toward organizing activities in Kentucky.

LOUISIANA: *Legislature meets May 14, 1928*

The situation in this state is similar to that in Kentucky.

MAINE: *Legislature meets Jan. 5, 1927*

There are no reports of activities in this state.

MARYLAND: *Legislature meets Jan. 5, 1927*

No reports have been received of any proposed changes in the motor vehicle laws.

MASSACHUSETTS: *Legislature meets Jan. 3, 1927*

A Massachusetts State Conference on Street and Highway Safety, called by Governor Fuller, was held in Boston on May 20, 1926. This meeting called upon officials of all cities and towns to study and make definite recommendations for carrying out the conclusions of the National Conference, recommended the appointment of a permanent committee to sponsor street and highway safety activities throughout the Commonwealth, and called upon the Police Departments to intensify their efforts. The Governor has appointed the Permanent Committee to carry out the findings of this Conference. Howard Coonley, President of the Massachusetts Safety Council, is Chairman.

MICHIGAN: *Legislature meets Jan. 5, 1927*

Two state conferences having for their purpose the adoption of a uniform traffic ordinance consistent with the Uniform Motor Vehicle Code have been held. One hundred and ninety cities and towns, or approximately 30 per cent of those in the state, have so far adopted this ordinance. A third state conference was held on November 15-16 to consider legislation to be proposed to the Legislature.

MINNESOTA: *Legislature meets Jan. 4, 1927*

The matter of incorporating the recommendations of the National Conference on Street and Highway Safety into the laws of the state has been undertaken by a joint committee composed of the Governor's Committee of Five and a committee appointed by the League of Minnesota Municipalities. This committee held two meetings leading up to a state-wide conference on November 19 and 20, called by the Governor.

MISSISSIPPI: *Legislature meets Jan. 3, 1928*

No special activities are reported in this state.

MISSOURI: *Legislature meets Jan. 5, 1927*

A state conference was held on May 10 and 11 in Jefferson City at the call of Governor Baker.

Two hundred persons attended this conference, representing 53 counties. A permanent organization known as the Missouri Association for Street and Highway Safety was formed. Roy B. Hinkle, State Labor Commissioner, is Chairman. Legislation based on the Uniform Vehicle Code as recommended by the National Conference is being proposed by this Association for presentation to the next State Legislature.

MONTANA: *Legislature meets Jan.* 3, 1927
No special activities have been reported.

NEBRASKA: *Legislature meets Jan.* 4, 1927
No special activities have been reported.

NEVADA: *Legislature meets Jan.* 17, 1927
No special activities have been reported.

NEW HAMPSHIRE: *Legislature meets Jan.* 5, 1927
The only special activities reported consist of conferences of the Commissioners of Motor Vehicles and the police authorities of the various cities and towns. However, Governor Winant at the Conference on Street and Highway Safety held in March offered the resolution requesting the members of the Conference from each state to serve as an organization committee for their respective states to promote the adoption of the Conference recommendations. This resolution was unanimously adopted.

NEW JERSEY: *Legislature meets Jan.* 11, 1927
It is reported that the Special Commission created by this year's Legislature has already begun investigation of the traffic conditions in the state, with the idea of drafting a uniform traffic law. Assemblyman Wise, of Passaic, is the Chairman of the Commission, other members of which are: Supervisor of Transportation Joseph Crawford, of Newark; Colonel Hugh A. Kelly, Governor Moore's personal aid; Senator Reeves, of Cumberland (Secretary of the Commission); and Assemblyman Hurd, of Bergen County. A meeting of the Commission was held at the State House on November 30, which was attended by Motor Vehicle Commissioner Dill and Major William G. Sloan, State Highway Engineer.

NEW MEXICO: *Legislatures meet Jan.* 11, 1927
No special activities have been reported.

NEW YORK: *Legislature meets Jan.* 5, 1927
A Safety Congress called by the Motor Vehicle Commissioner was held in Albany on March 11-12-13, 1926. It was attended by motor vehicle commissioners and safety directors from eastern and central parts of the United States. A second Congress of the same kind will be held at either Rochester or New York early in 1927. The State Motor Vehicle Bureau is supplying speakers for automobile clubs, luncheon clubs, etc. The Bureau is also planning to make traffic surveys in various cities of the state. A Westchester County Conference on Street and Highway Safety was held in White Plains, N. Y., June 10, 1926. Revised traffic regulations for the city of New York to go into effect January 1, 1927, are expected to be issued shortly by the Police Department.

NORTH CAROLINA: *Legislature meets Jan.* 5, 1927
No special activities have been reported.

NORTH DAKOTA: *Legislature meets Jan.* 4, 1927
The North Dakota Safety Council was organized at a state conference called by the Governor last April, and Frank Milhollan, President of the State Board of Railroad Commissioners, was elected President. One of the principal purposes of the Conference and Council is to promote the adoption of the Uniform Motor Vehicle Code by the next Legislature.

OHIO: *Legislature meets Jan.* 3, 1927
An Ohio State Safety Council has been organized under the sponsorship of the Cleveland Automobile Club, the State Automobile Association, the Cleveland Safety Council, the State Farm Bureau, and other organizations. Its chief purpose is to propose new legislation, including a drivers' license law. The Ohio Association for Prevention of Grade Crossing Accidents is considering calling a conference on proposed legislation.

OKLAHOMA: *Legislature meets Jan.* 4, 1927
No special activities have been reported.

OREGON: *Legislature meets Jan.* 10, 1927
No special activities have been reported.

PENNSYLVANIA: *Legislature meets Jan.* 4, 1927
The League of Cities of the Third Class has named a committee to work in the interest of uniform traffic legislation. Fred Gates, City Clerk of Wilkes-Barre, is Secretary of this organization. It is reported that the fourth proposed act in the Uniform Vehicle Code, that is, the act prescribing uniform rules of the road and regulation governing the operation of vehicles on highways, will be pushed for adoption by the Legislature. It is also reported that a state-wide conference is to be held in Harrisburg on December 8.

RHODE ISLAND: *Legislature meets Jan.* 4, 1927
The Governor has appointed a permanent committee, of which George R. Wellington, Chief Clerk of the Bureau of Public Roads, is Chairman. This committee has taken up actively the work of preparing legislation for introduction at the next session of the Assembly. The Committee meets monthly. It has already held one state-wide conference attended by officials of police departments, chambers of commerce, and safety organizations. It is planning an accident reduction contest. A state organization of chiefs of police has also been formed which meets regularly.

SOUTH CAROLINA: *Legislature meets Jan.* 11, 1927
The Governor has appointed a permanent committee on street and highway safety, of which R. E. Hanna, President of the Calhoun Highway Association, is Chairman.

SOUTH DAKOTA: *Legislature meets Jan.* 4, 1927
No special activities have been reported.

TENNESSEE: *Legislature meets Jan.* 3, 1927
Three meetings have been held looking to the adoption of the Uniform Vehicle Code in Tennessee. One of these consisted of eighteen members of the National Conference from Tennessee. This was held in Nashville last May. The second meeting, which was held on June 28 and 29, was attended by mayors, county judges, members of chambers of commerce, etc. A third meeting was held on October 11 and 12, at which time plans were made to further state legislation.

TEXAS: *Legislature meets Jan.* 11, 1927
W. E. James, Director of the Texas Council of Safety, reports that at the May meeting of the Council's Executive Committee it was decided that careful study of the National Conference recommendations should be made and the Chairman was

authorized to appoint a Committee of Fifteen for that purpose to report before the first of January. A state-wide conference is scheduled to be held in Austin, December 10, under the auspices of the Texas Council of Safety.

UTAH: *Legislature meets Jan.* 10, 1927
The Governor has appointed a general committee of twelve who are preparing recommendations in conformity with the Uniform Vehicle Code. This committee met on Monday, October 4, and has recommended the calling of a state-wide conference of interested groups to receive the committee report and to give the Governor a cross-section of sentiment as a guide to his recommendations.

VERMONT: *Legislature meets Jan.* 5, 1927
The Secretary of State reports that so far as he knows there is no movement on foot to cause the adoption of the uniform laws recommended by the Conference.

VIRGINIA: *Legislature meets Jan.* 11, 1928
The Legislature at its last session, and prior to completion of the Uniform Vehicle Code, passed a Motor Vehicle Act based on the recommendations contained in the reports of the First National Conference on Street and Highway Safety.

WASHINGTON: *Legislature meets Jan.* 10, 1927
No special activities have been reported.

WEST VIRGINIA: *Legislature meets Jan.* 12, 1927
No special activities have been reported.

WISCONSIN: *Legislature meets Jan.* 12, 1927
The Governor has agreed to call a state conference on street and highway safety and has delegated Samuel Bryan, of the State Railroad Commission, M. W. Torkelson, of the State Highway Commission, and V. F. Pettric, of the State Motorists' Association, to make the necessary arrangements.

WYOMING: *Legislature meets Jan.* 11, 1927
No special activities have been reported.

Voters Endorse Proportional Representation in Three Ohio Cities

CINCINNATI, by a vote of two to one, on November 2, adopted a new charter in which the previous provision for a council of nine, elected by proportional representation at large, and a city manager chosen by the council, were left unchanged. The revision was the work of a commission provided for in the P. R.—manager amendment of 1924. It was supported by the City Charter Committee responsible for the previous amendment and opposed by most of the Republican "regulars" who had opposed the previous amendment. The size of the vote in its favor, together with the approval of all but one of the bond issues presented for city improvements, is regarded as an indorsement of the independent administration which replaced the Hynicka organization régime at the first P. R. election a year ago.

Ashtabula, which adopted P. R. and the manager plan in 1915 and has used P. R. longer than any other American city, voted on four amendments providing for popular election of manager and auditor and a return to plurality elections. Although the city government has been seriousiy embarrassed in its services this year by an action of the county budget commission cutting down expenses to $93,000, as compared with $142,000 in 1925 and $158,000 allowed for 1927, all four amendments were defeated on November 2 by majorities ranging from 342 to 467 in a vote of about 4,000. This is the second time that Ashtabula has defeated attacks on P. R. and the manager plan.

Hamilton, on the same day, adopted a new charter providing for P. R. and the manager plan by the narrow margin of 178 votes. The charter was presented by a representative charter commission, including business men, labor leaders, and school teachers, and supported by both political parties and the present Mayor. It was opposed by all the members of the present Council, who issued a broadside against it four days before the election. The drafting of the charter was the work of Dr. A. R. Hatton, of Cleveland, charter consultant of the National Municipal League, who regards it as the best city charter in the United States.

GEORGE H. HALLETT, JR.,
Executive Secretary, Proportional Representation League.

Some Large Bond Issues Voted Last Month

AT the November elections, voters in the following cities, among others, authorized bond issues providing for important programs of municipal improvements.

Chicago and Cook County voted in favor of an issue of $15,000,000 for widening and improving the county roads leading to Chicago. The South Park District and the Lincoln Park District, Chicago, voted $5,000,000 and $3,000,000, respectively, for the construction of a bridge across the Chicago River. The South Park District also approved a $500,000 bond issue for park developments. Detroit passed a proposition to spend $30,000,000 for extensions to the city water system.

The citizens of Toledo, Ohio, approved the following issues: sewer construction, $2,000,000; sewage disposal works, $2,500,000; widening and extending streets, $500,000; police and fire-alarm headquarters, $300,000; and the extension of police and fire-alarm systems, $90,000. This city also voted a one-mill levy for street improvements, which will provide a revenue of $600,000 a year for a five-year period to pay the city's share of paving costs.

Several other Ohio cities have also approved large bond issues. Cincinnati voted in favor of the following: street improvements, $1,000,000; grade-crossing elimination, $1,000,000; street widening, $1,000,000; and parks and boulevards, $1,250,000. In Cleveland, expenditures of $2,000,000 for streets and sewers, $275,000 for fire-alarm signal system, and $800,000 for grade-crossing elimination were authorized. Four bond issues were passed in Dayton: $8,000,000 for grade-crossing elimination; $400,000 for fire-alarm signal system; $450,000 for street and sewer improvements; and $100,000 for street openings.

Essex County, N. J., authorized a $5,000,000 bond issue for county parks and parkways.

These Men Are Managing the Affairs of the Nine Largest City Manager Cities

C. O. SHERRILL,
City Manager,
Cincinnati, Ohio

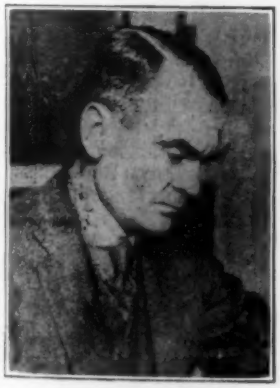
CHARLTON KARNS,
City Manager,
Knoxville, Tenn.

H. F. McELROY,
City Manager,
Kansas City, Mo.

F. A. RHODES,
Manager of Operation,
San Diego, Calif.

WILLIAM R. HOPKINS,
City Manager,
Cleveland, Ohio

FRED O. EICHELBERGER,
City Manager,
Dayton, Ohio



I. WALKE TRUXTON,
City Manager,
Norfolk, Va.

O. E. CARR,
City Manager,
Fort Worth, Texas

FRED H. LOCKE,
City Manager,
Grand Rapids, Mich.

Financial Statistics of Cities for 1925

Census Bureau Summarizes Data from 247 Cities of 30,000 Population and Over

ALMOST simultaneously with the publication of its detailed report on Financial Statistics of Cities for 1924, the Bureau of the Census has released a summary of certain statistics which will appear in the corresponding volume for 1925, now being compiled. This latest report will embody financial statistics for the fiscal year ending January 1, 1926, or the fiscal period closing prior thereto, of the 247 cities having a population of 30,000 and over on January 1, 1920, or as a result of an official census taken since that date.

Independent Divisions

These statistics cover the government of the city corporation proper, and also independent school districts, sanitary districts, park districts, and other independent districts practically coextensive with the cities. They also include a per cent of the financial transactions, debt, and tax levies of the county governments for cities having over 300,000 population, in order that the statistics for such cities may be comparable with those for other cities in this class in which the ordinary county functions are performed by the city government.

Assessed Valuation and Tax Levies

For the 247 cities having a population of over 30,000, the assessed valuation of property subject to general property taxes for city purposes amounted to $63,584,524,863, or a per capita of $1,560.07.

The total levies on the property subject to general property taxes in these cities for the governments of the cities, counties, states, school districts, and all other governmental units for all purposes amounted to $1,936,343,361, or an average for each person of $47.51.

Revenues

The total revenue receipts in 1925 of the 247 cities having a population of 30,000 and over were $2,508,924,366, or a per capita of $61.56. This was $570,755,502 more than the total payments of the year, exclusive of payments for permanent improvements, but $403,066,594 less than the total payments, including those for permanent improvements. In only 44 of the cities was there sufficient revenue to meet all payments during the year. The payments in excess of revenue receipts were met from the proceeds of debt obligations. The classification of the revenues is presented in the following table:

REVENUE RECEIPTS—1925

	Total	Per Capita	Per Cent Distribution
All revenues	$2,508,924,000	$61.56	100.0
General property taxes	1,597,491,000	39.20	63.7
Special property and other special taxes	61,491,000	1.51	2.5
Poll taxes	4,696,000	0.12	0.2
Licenses	72,791,000	1.78	2.9
Special assessments	184,347,000	4.52	7.3
Fines, forfeits, and escheats	17,765,000	0.44	0.7
Subventions, donations, and pension assessments	127,264,000	3.12	5.1
Interest, rents, and highway privileges	118,606,000	2.91	4.7
Earnings of general departments	66,729,000	1.64	2.7
Earnings of public-service enterprises	257,744,000	6.32	10.3

Governmental-Cost Payments

The total cost of government in 1925 of the 247 cities in this class amounted to $2,911,990,960. An analysis of this total shows that the costs for the operation and maintenance of the general departments were $1,525,556,704, a per capita of $37.43, and representing 52.4 per cent of all costs of the 247 cities; operation and maintenance of public-service enterprises, such as water-works, light plants, public markets, and similar enterprises, $146,602,539, a per capita of $3.60, and 5.0 per cent of the total; interest on debt, $266,009,621, a per capita of $6.53, and 9.1 per cent of the total; and for outlays, or permanent improvements of general departments and public-service enterprises, $973,822,096, and 33.4 per cent of the total cost.

EXPENSES FOR OPERATION AND MAINTENANCE OF GENERAL DEPARTMENTS—1925

	Total	Per Capita	Per Cent Distribution
All general departments	$1,525,557	$37.43	100.0
General government	129,184,000	3.17	8.5
Protection to person and property	306,504,000	7.52	20.1
Health and sanitation	153,116,000	3.76	10.0
Highways	133,214,000	3.27	8.7
Charities, hospitals and corrections	89,406,000	2.19	5.9
Education	591,420,000	14.51	38.8
Recreation	49,934,000	1.23	3.3
Miscellaneous	72,779,000	1.79	4.8

Indebtedness

The gross debt outstanding at the close of the year amounted to $6,650,590,864, or a per capita of $163.17, consisting of $6,001,410,607, funded or fixed; $367,426,743, special assessment bonds and certificates; $210,847,474, revenue loans; and $70,906,040, outstanding warrants. Of this total gross debt, $5,823,406,984 was issued by the city corporation, $512,309,011 by school districts practically coextensive with the city corporation, and $314,874,869 by other governmental units.

The net indebtedness (funded or fixed debt less sinking-fund assets) of the 247 cities amounted to $4,659,629,234, or $114.33 per capita, in 1925.

In the following table is presented for the 146 cities covered by the census reports for the specified years the total and per capita funded or fixed debt less sinking fund assets:

Year	Net Debt * Total	Per Capita
1925	$4,240,379,000	$119.45
1924	3,841,980,000	110.09
1922	3,280,646,000	97.57
1919	2,541,172,000	81.18
1918	2,508,095,000	80.96
1917	2,445,852,000	80.75
1915	2,245,906,000	77.86
1905	1,119,346,000	50.94

* The net debt is funded or fixed debt less sinking-fund assets.

Comparison of Revenue Receipts and Governmental-Cost Payments Over a Period of Years

In the following table are presented comparable revenue receipts and payments for operation and maintenance, total and per capita, together with total payments for outlays for the aggregate of the 146 cities covered by the several census reports for specified years:

	Net Revenue Receipts		Net Government-Cost-Payments *				
			For Operation and Maintenance		For Interest		For Outlays
Year	Amount	Per Capita	Amount	Per Capita	Amount	Per Capita	
1925	$2,197,242,000	$61.90	$1,501,038,000	$42.29	$198,082,000	$5.58	$850,029,000
1924	2,088,512,000	58.41	1,410,579,000	40.42	181,438,000	5.20	712,679,000
1922	1,801,302,000	53.57	1,248,986,000	37.14	194,584,000	5.79	540,752,000
1919	1,103,666,000	35.26	756,747,000	24.18	121,731,000	3.89	235,122,000
1918	1,014,898,000	32.76	688,490,000	22.23	117,236,000	3.78	249,998,000
1917	968,445,000	31.97	633,622,000	20.92	110,909,000	3.66	262,759,000
1915	865,271,000	30.00	586,791,000	20.34	103,387,000	3.58	305,883,000
1905	498,837,000	22.79	327,050,000	1488	51,898,000	2.36	182,525,000

* The governmental-cost payments include all payments for the year, whether made from current revenues or from the proceeds of bond issues. The proceeds from the issuance of debt obligations are not considered revenue receipts.

Effect of Public Improvements on Real Estate Values

CONCRETE illustrations of the effect of public and semi-public improvements on real estate values are given in a recent pamphlet* by Joseph K. Brittain, President of The Chicago Real Estate Board. In this pamphlet, which was printed shortly before the opening, last month, of Chicago's new double-decked thoroughfare, Wacker Drive, Hyde W. Perce, Realtor, is quoted as follows:

"Prior to the beginning of this improvement, valuation of the land only on the south side of South Water Street, between Market Street and Michigan Avenue, made by a Valuation Committee of prominent Chicago Real Estate Board members, was $17,135,997. In order to sustain the assessment for improvement, the entire assessed area, covering one and a quarter (1¼) miles, was also valued, viz.: $1,328,492,365. The cost of the improvement was approximately $25,000,000. The average benefits (estimated by the already mentioned Chicago Real Estate Board Committee on Valuations) covering the entire assessed district were $40,000,000. The facts based on actual sales and leases such as the southwest corner of LaSalle Street and Wacker Drive, the southwest corner of Wabash Avenue and Wacker Drive, and recent purchases by individuals of inside holdings on a basis of $100 a square foot, sustains that judgment as to values. The present value for the same frontage is over $50,000,000. Taking the same proportion of the original estimate of benefits for the remainder of the district outside of Wacker Drive and as originally given at $30,000,000, makes a total benefit to real estate holdings, within the assessed district, from an expenditure of $25,000,000, of $80,000,000, and the improvement not yet completed."

The financial benefits which have come to real estate as a result of improvements on North Michigan Avenue are stated by Edwin J. Bowes, Realtor:

"Again referring to what improvements mean, one may refer to what North Michigan Avenue now is and what it was before the present improvements were made. The northwest corner of this thoroughfare and Ontario Street was purchased by me for $28,000, improved with buildings at a cost of $17,000, and later sold by us for $95,000, based upon the prospect of the existing street being changed into a thoroughfare connecting with Michigan Avenue upon the south. The present value of this holding, after taking from it the land required for widening, still leaves a holding valued in excess of $600,000—all caused by improvements which have affected the entire district, and based upon the fact that they have made it possible to use this territory for superior uses as compared with those in effect prior to these changes."

In commenting on these and other improvements mentioned in the pamphlet, Mr. Brittain says:

"We generally think of expenditures for public improvements as merely providing additional facilities for comfort, safety or convenience. However, it is almost universally true that such expenditures add not only their cost but additional value to the property. The value per front foot just as soon as modern public improvements are acquired is frequently two and three times, and in many cases more times, the original value, especially in new territory. If to the values added by public improvements are added increased values because of attractive new homes, or new places of business, or improved transportation, values are seen to rise still more rapidly."

Although Mr. Brittain does not discuss the question of assessments for benefits, municipal officials with such facts and opinions before them can hardly fail to be impressed with the justice and desirability of assessing against benefited real estate the largest possible percentage of the cost of public improvements.

* "Public Improvements and Permanent Real Estate Values," obtainable for 2 cents postage from the Municipal Reference Library, City Hall, Chicago, Ill.

Grade Crossing Death Roll Continues to Grow

THE alarming list of victims of the grade-crossing menace reported during the past year continues to mount. The number of mortally injured was increased by five in a single accident when on November 5 a Long Island Railroad train at a grade crossing in the Woodhaven district of New York City, crashed into an automobile with seven passengers. The remaining two occupants were seriously injured. For some reason, of which conflicting reports have been received, the gates were not lowered when the car started to cross the tracks.

Commenting in its editorial columns on this latest accident at the Elderts Lane crossing, which has been the scene of numerous fatal crashes in the last few years, the *New York Times* said:

"The question of whether or not the gatemen of the Long Island Railroad were "on the job" at the Eldert Lane crossing when the fatal accident occurred on Thursday night is incidental to the major propostion that the existence of grade crossings near the city and over the main highways is an ever-increasing menace.

"It is true that in most accidents at grade crossings the automobile drivers have a large share of responsibility. Too many persons do not pay sufficient attention, or are unwilling to slow down when approaching crossings, or else "step on the gas" in order to get across before the train. On some occasions negligence of the gatekeepers misleads the drivers.

"But the fact remains that the grade crossing is antiquated and evil. The removal of such crossings has necessarily been slow because of the enormous expenditure and the technical difficulties in the way of doing the required grading and filling. It has been customary to blame the railroads for not going ahead with the work of removal rapidly enough. They have been hampered, however, with the slowness of the governmental machinery in settling points at issue among the three parties to this work—state, municipality, and railroad. But the work must be pushed with all possible speed."

P & A Photos

GRADE CROSSING KILLS FIVE OF ONE FAMILY

The jumble of junk shown in the picture is all that is left of an auto that was hit by a Long Island train at a grade crossing at Atlantic Avenue and Eldert Lane, Brooklyn, N. Y., on November 4. Five members of one family were killed and two other members were injured

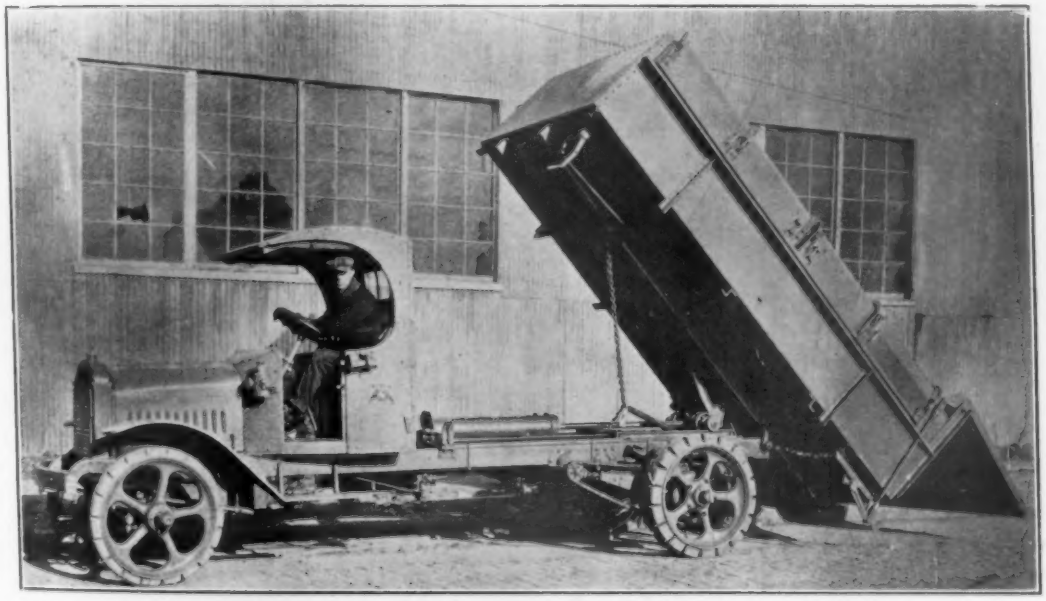
The New York *World* similarly urges speed in elimination of grade crossings in this state:

"The killing of five persons at the Eldert Lane grade crossing on the line of the Long Island Railroad once more proves the need of haste in getting railroad tracks off the street level. As to why the gates were not lowered there is a conflict of testimony; but neither gates nor watchmen would be required if the grade crossings were abolished. The people made no mistake in voting to hasten this lifesaving work by the issue of bonds."

South American City Improves Refuse Collection Service

THE FORMER COLLECTION METHOD IN THE CITY OF BUENOS AIRES, ARGENTINA, IN WHICH MULE-DRAWN DUMP-TRUCKS WERE USED

These wagons required two men each to handle, while the new motor-driven equipment illustrated below needs only one man



MACK TRUCK OF THE TYPE NOW USED BY THE CITY OF BUENOS AIRES, EQUIPPED WITH WOOD UNDERBODY HYDRAULIC HOIST FOR THE SPEEDY AND ECONOMICAL COLLECTION OF ALL CITY WASTES

Municipal Accounting and Finance

Conducted by Francis Oakey, C. P. A.

Member of the Firm of Searle, Oakey & Miller, New York

The Information Needed in Respect to Revenues

IN the management of municipal affairs sound financing consists in raising sufficient revenue each year to pay for the year's full share of the cost of government. Failure to pay the total year's cost out of revenues means that a payment of a portion of the cost is merely postponed or shifted to a subsequent year, since eventually all the costs of government must be met out of revenues.

Consequently, the amount of revenues which should be raised each year is a most important question. An unsound revenue-raising policy is almost invariably closely associated and coincident with an unsound borrowing policy. In fact, each is dependent upon the other, and together are the most common cause of an unsound financial condition.

A sound revenue-raising policy cannot be formulated and adopted unless each year's full share of the cost of government is determined. This full share comprises four main items, namely:

1. The year's expenses of administration, operation, and current repairs
2. The year's share of the cost of additions, betterments, and replacements of depreciating property
3. The year's share of the redemption of debt
4. The amount of interest on outstanding debt, applicable to the year

The Year's Expenses of Administration, Operation and Current Repairs

This group represents the city's living expenses. In it are included all the day-to-day expenses of the administrative offices and of the several operating departments. Such expenses include a variety of items, of which the main ones are payrolls, supplies of all kinds, heat, light, power, telephone and telegraph, rent, current repairs of buildings and equipment, etc. It is obvious that expenses of these classes must be paid each year out of the revenues of the year, since the benefits therefrom accrue solely to the year in which they are incurred, that is, do not continue after the expenditure is made.

The Year's Share of the Cost of Additions, Betterments and Replacements of Depreciating Property

In order to maintain its services, the city must acquire or construct property of a semi-permanent although depreciating character, such as buildings, streets, sewers, equipment, etc. Such property lasts and is used for a period of years, but finally becomes unfit for further use and has to be replaced. Although property of this kind has to be paid for at the time it is acquired, benefits are derived therefrom in each year of its useful life, which may continue for twenty or thirty years or even longer. It would be manifestly unfair for the taxpayers of the year in which such property was acquired to bear the whole cost. In fact, the cost of provision should be borne equally by the taxpayers of the several years during which the property is used. In short, a part of the cost of government applicable to each year is the year's proportionate share of the total cost of additions, betterments and replacements of depreciating property.

The question immediately arises: How is this proportionate share to be determined and when determined how distributed? If a new building costs $600,000 and it is estimated that it will last thirty years and at the end of that period will have to be replaced, then it appears that each year in that period should bear $20,000 of the cost. In other words, the estimated annual depreciation is each year's share of the cost of providing the building. By applying this principle to each item of depreciating property, the total estimated annual depreciation for all depreciating property owned by the city is determined. This total represents the year's share of the cost of providing all the property, and to the extent of this sum the year should contribute to the cost of additions, betterments, and replacements.

If it is found at the close of the year 1926

that the total annual depreciation is one million dollars, the expenditure of this sum out of the revenues of the year 1927 for additions, betterments and replacements of property is a part of that year's share of the cost of government. It is not essential whether this sum be spent to acquire a new and additional building, to improve a building previously acquired, or to tear down and replace a building worn out or become obsolete; the essential point is that the amount be expended out of revenues for one or all of these purposes.

The Year's Share of the Redemption of Debt

Debt must be redeemed out of revenues. Refunding of debt is merely a postponement of payment made necessary because no provision of funds has been made for redemption. In municipal finance there is only one source from which funds for this purpose can be obtained, and that is revenues. Since the amount of an issue of debt is too great to be redeemed out of the revenues of a single year, it is necessary to distribute this burden over a period of years. This is most simply done either by raising a sufficient amount of revenue each year to provide an installment to a sinking-fund, or by the practice of issuing serial bonds.

If the sinking-fund method is used, the annual installment must be adequate, that is, it must be that amount which, if accumulated, will equal the amount of the principal of the debt at maturity. If the annual installment is not enough, the accumulation at maturity of the debt will be insufficient for the redemption. If this is the result, it is clear that none of the years of the period during which the debt was outstanding has contributed its full share of the amount required for redemption.

The Amount of Interest on Outstanding Debt Applicable to the Year

It is hardly necessary to state that the year's interest charges must be paid for out of the revenues of the year. Interest is a charge for the use of borrowed money; it always covers a certain period of time and is therefore applicable as a charge to that period.

The Statement of Revenue Requirements

By a careful consideration and estimate of the factors discussed in the foregoing paragraphs, the amount of revenues which should be raised each year may be determined. This information is a very important part of the budget and should therefore be incorporated in a statement supporting the budget summary. This statement of revenue requirements reflects an essential part of the financial program formulated and proposed by the administration. It should be presented somewhat in the following form:

Total Amount of Revenue Required to Be Raised to Finance the Estimated Expenditures Approved by the Mayor for 1927..	$.....
The foregoing total is required to meet the following expenditures:	
1. Expenses of administration, operation and maintenance	$.....
2. The year's share of the cost of additions, betterments and replacements of depreciating property, the equivalent of the estimated depreciation for the year	$.....
3. The year's share of the redemption of debt, being the required annual installment to the sinking fund.....	$.....
4. The amount of interest which will become due during the year on outstanding debt	$.....
Total	$.....

Details supporting the four totals described above should be presented in the statements of expenditures, the debt statement, and the sinking fund statement.

Detailed Statements of Revenues

Having determined the total amount of revenues which should be raised, it is obviously also essential to determine the various sources of revenue and the amount to be derived from each source. Conclusions in respect to these details must be reflected in a detailed statement. This statement supports the statement of revenue requirements and should present the amount derived in the past year and anticipated in the coming year from each class of revenue. The following schedule shows the extent of detail to which this statement should be carried:

Miscellaneous revenues:

1. Licenses
2. Permits
3. Privileges
4. Franchises
5. Fees
6. Fines, penalties
7. Rents
8. Interest, premium and discount
9. Proceeds of sales of commodities and services
10. Pension assessments

Under each of these main classes the several subclasses of revenue should be shown. For example, licenses might be subclassified as follows:

1. Peddlers
2. Pawnbrokers
3. Dance-halls
4. Dogs
5. Marriages
6. Etc.
7. Etc.

Under the main heading "Franchises" the names of the corporations should be shown.

Under the heading "Interest, Premium and Discount" the following details should be presented:

1. Interest on deposits
2. Interest on securities (other than sinking-fund)
3. Interest on delinquent taxes
4. Premium on bonds sold
5. Discount on bonds purchased

Items numbered 4 and 5, above, when applicable by law to the sinking-fund would be shown in the sinking-fund statement.

The total amount of miscellaneous revenues deducted from the total revenue requirements produces the amount which must be raised by taxation on real and personal property. This amount should be included at the bottom of the revenue statement and should be accompanied by the total assessed valuation and the tax rate as soon as these figures are known.

The Necessity for a Standard Classification and Nomenclature of Revenues

In any attempt to convey information, a common language must be used; otherwise understanding will not be complete. In a statement of revenues each class of revenue must be given a standard title which is generally understood to comprise only certain items, and no other items must be included. Moreover, the standard titles must be adhered to until it is found necessary to change them and then any new titles must be defined. Such standardization is essential not only to convey exact information, but also to permit comparisons from year to year. Finally, the standard titles must be classified and the classification made standard, so that the details will always be presented in the same order and grouping.

The Necessity for Clear Information Respecting Revenues

Although the subject of taxation and the related question of revenue-raising is receiving today general attention, there is perhaps no subject relating to municipal finance on which there is more loose thinking. Everyone wants taxes reduced. Candidates for office, sensing the need for a response to the question, declare themselves for various programs or principles of financing. For instance, the "pay-as-you-go" policy is often advanced without an attempt at definition. If this proposal means that each year revenues shall be raised sufficient in amount to pay for the year's *full* share of the cost of government, we are in favor of it. But usually it does not mean this; the year's full share of the cost of government is not determined and often not even understood. Instead, the so-called "pay-as-you-go" policy usually contemplates avoiding the issuance of bonds. As a matter of fact, the issuance of bonds does not necessarily mean extravagance; on the contrary, such issuance may be a part of an economical and sound program. The real tests of a bond issue as a sound measure of financing are (1) whether it is issued for permanent improvements which cannot fairly be financed out of the year's revenues, and (2) whether the term of the bond issue does not exceed the life of the improvements for which it pays. In the last analysis, there is only one policy in municipal financing which is sound—the payment of each year's *full* share of the cost of government out of revenues.

—*Copyright, 1926, Francis Oakey.*

Joint Meeting of American Society for Municipal Improvements and Asphalt Paving Congress

With a registered attendance of 708 engineers, public officials and asphalt producers and paving contractors, the convention of the American Society for Municipal Improvements and the Fifth Annual Asphalt Paving Congress was held in the Mayflower Hotel in Washington, D. C., November 8-12, 1926.

The central theme running through the Asphalt Conference session was that of salvaging old gravel and macadam roads and worn-out streets with asphalt surfaces and the paving of secondary roads of the nation, especially those highways which act as feeders for the railroads and lead to the markets of the world.

The matter of salvaging the old gravel and macadam highways as an economic measure was brought very forcibly to the attention of the Conference by United States Senator George H. Moses of New Hampshire, President pro tem of the Senate and Chairman of the Senate Committee on Post Offices and Post Roads, who addressed a joint meeting of the Conference and the American Society for Municipal Improvements on Tuesday afternoon. A wide variety of subjects was discussed in the various papers, which will be abstracted and printed in THE AMERICAN CITY *for the benefit of its readers.*

Leisure as a Cause or Cure of Crime

By Charles Platt, M. D., Ph. D.
President, National Probation Association

SOCIETY to-day has many problems, but there are few greater than this of learning how to use our leisure. We are seeking for the source of a hypothetical crime wave, just as each generation before us has done, and, patriotically, we are seeking it in the effects of immigration and other like causes. But might it not be more useful, even if not quite so patriotic, to look for its origin in our own basic characteristics?

Let me quote from an article of mine in the *Century* magazine:

"Our streets are now filled with roving crowds of the idle and restless. These people do not know what to do with themselves. They know nothing of healthful play; their athletics they get only from the sidelines; and as for cultural diversions, they have for these but a withering contempt. Entertainment, amusement, stimulation—largely physical—have become, seemingly, the main quest in life.

"Then think, too, of the new economic freedom of youth and the resulting possibility of gratifying many adolescent desires. But adolescent desires never get satisfied, and, finally, there is reached a point which no honestly earned wage is high enough to cover, and other sources of income must be discovered."

Is there a connection between leisure and crime? I should say there is.

The excited brain makes extravagant demands. These youths know well that if they get only what they are truly worth they will not get much. So they do not even try. They learn no useless trades. They turn at once to the greater possibilities of crime—a calling which, in itself, offers many pleasing thrills and attractions. We have a new criminal in the court to-day—no beetle-browed thug, but a fine, upstanding youth who has gone into the thing purely as a sporting proposition, promising large returns.

In our studies of delinquency, we have long ago arrived at the conclusion that for any bettering of society we must go back to elemental principles. We know now that life is so complex that there can be no simple formula for the cure of its evils. We have tried formulas. We have tried, for instance, punishment. We have applied, at various times in the past, and for long periods, every torture that man and the Devil have been able to think up between them. We have even tried killing our offenders. And while this last has, indeed, succeeded so far as the individual has been concerned — a successful hanging being always a serious matter, one that may be guaranteed to keep a man from ever again committing an offense — still, even this, as a social and preventive measure, may be considered to be in doubt.

It is always possible that brutality from those in power may be reflected by a general brutality, and that in endeavoring to correct society's delinquents by too harsh methods, we may eventually do harm by making society itself more recalcitrant or indifferent. When England hanged pickpockets, the scene of execution was the happy hunting-ground of the pickpocket fraternity, and many were the ribald jibes hurled alike at the dangling victim and at those who had just "turned him off."

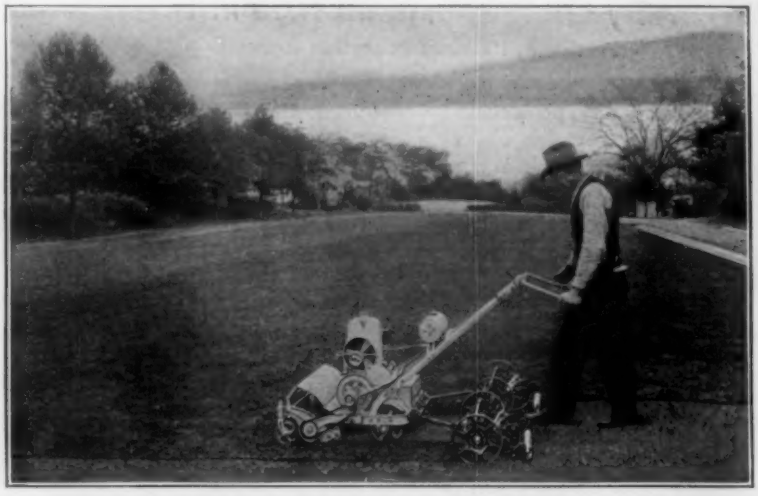
However, punishment is not the only formula that has been tried. There have been many. Precepts have been recited from the beginning of time, and laws have been promul-

The Challenge of the Shorter Work Day and Week

In the greatly increased leisure which inventive skill and managerial ability have made possible for the adults and the youth of America, a unique challenge has come to the public officials and the civic and welfare organizations of our cities, towns and villages.

Shall this increased leisure mean "more mischief still for idle hands to do," or shall it be made—through properly organized recreation movements—an unprecedented opportunity for the development of a finer social order?

The author of the accompanying article believes that the latter is possible. As President of the National Probation Association, Director of the Pennsylvania Committee on Penal Affairs, and Chairman of the Citizens' Committee of the Municipal Court of Philadelphia, Dr. Platt discusses the relationship of leisure and crime with the authority of an expert. The address from which this article has been abstracted was delivered by him before the Recreation Congress of the Playground and Recreation Association of America, at Atlantic City, October, 1926.



Model "L", shown above, mows and rolls 4 to 6 acres a day.
With gang units attached it cuts 10 acres a day on one gallon of gasoline.

Dependability Pays!

or, The Reward of Dependability

Why do Coldwell Lawn Mowers hold their outstanding position in the preference of municipalities?

Because under every possible condition of mowing and rolling, they have demonstrated their *absolute dependability*. And in this factor of dependability lies the economy and satisfactory service which have made Coldwell the largest selling lawn mowers in the world, and the soundest investment for *your* money.

For over 60 years Coldwell dependability has been proved on parks, cemeteries, schools, public grounds and gardens throughout the nation. The Coldwell guarantee insures you of complete service satisfaction.

Literature illustrating and describing the full line of Coldwell Lawn Mowers will be sent on request.

HAND — HORSE

SINCE 1867

COLDWELL

DEPENDABLE LAWN MOWERS

GASOLINE — ELECTRIC

COLDWELL LAWN MOWER COMPANY, NEWBURGH, N. Y., U. S. A.

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

gated—so many of these latter that we do not now worry if we happen to break any. We know that, break as many as we will, there will always be plenty left over.

In our search for a formula, we have even overturned governments. Autocracies and aristocracies have been replaced by democracies and by attempts at socialism, and from these often—perhaps after a devastating plunge into anarchy—we have emerged to the autocracy again, to fascism and despotism.

What is it that is being sought? Well, as I see it, what we are trying to do is to find some way of bettering society, without at the same time changing ourselves. We hope to make society a better place for ourselves to live in. We are shy of those elemental methods which may involve us in a correction of our own faults, so we gesture futilely in other directions.

Crime we may describe as a result of an imperfect social adjustment. It is but the expression of an unyielding ego, the consequence of an attempt to lead a group life on the individual basis, irrespective of others and of others' rights. And the fact is, of course, we all begin life as perfect egoists—as babies—and we have to learn to be social. To get a man capable of good group judgment, a man with self-control, with a high regard for truth, with a keen sense of honor, a man who can recognize easily his duty to others, and do it—to get such a man, the necessary social patterns must be made a part of his education—a major part.

Honor, sense of duty, self-control, and a strict regard for truth—these necessary attributes of a normal social life are themselves of the very essence of play. They are the attributes that make play possible, that make of it a joyous undertaking. See how our language recognizes play's ethical worth. Playing the game — fair play — good teamwork — good sportsmanship—these all mean something pretty fine. Do we mean anything fine when we speak of "good business"? We generally mean then just something shrewd, something smart, something, indeed, not forbidden by law, but something otherwise not at all admirable. And here we are now, arguing for play as providing the more desirable elements of character, when our language had recognized and crystallized that fact long years ago.

Play Must Be Quite as Much a Community Responsibility as Is the School

We have to-day great schools freely contributing to one side of man's development—the intellectual side. Let us now provide for that other and more important side—the moral and social. There would be a real profit in this. In the first place, the results would likely be practical and useful. We can never in school get facts enough to cover all future situations. What we need is principles—universal principles, play principles, principles that can guide us through all future difficulties. Then think, too, of the greater accomplishment that is possible with this proposed moral education. There are natural limits to intellectual attainment—the gods themselves are helpless with a fool—but morals may be cultivated even when the intellect is closed. We are dealing here with emotions and habits and there is nothing short of idiocy or insanity that need stop us. Surely, then, play must be quite as much a community responsibility as is the school, and the community's gain therefrom might be even greater. But is this to-day generally recognized?

About one thousand million dollars are invested in golf courses and country clubs in this country. The grown-ups have taken care of themselves. But this golf-playing social crust of ours is not unlike a group of adults sitting around a radio set, listening to the bedtime stories, the receivers on their ears, while the children of the household stand by disconsolately. This is play, it may be, but it is play so directed as to have the least possible social value. The successful ones, those able to pay country club dues, are not those who are tempted to crime—or if they are, they can easily get away with it—as their lockers at the club house will too often reveal.

I have read the reports of the Playground Association. I have marveled at the figures presented. But there is another way these reports might be written. They might tell, not of the accomplishment, not of the growth of the play movement, but rather of the thousands of communities that have no public recreation facilities. They might tell of the hundreds of thousands of children who get what play they know only in the gutter, on the streets, dodging the police, breaking the law—often even sacrificing their lives to satisfy their natural craving. And then these reports might tell of those older children who find their so-called play only in the movies, in the pool-rooms, in the vice-conducted dance halls.

The nearest most of our city youths ever come to play is in acting as bloodthirsty spectators at some professional ball-game or prize-fight. This, I say, is the nearest they come—but just think of the distance!

What these children and youths get is just

for Economical Transportation

CHEVROLET

A Rugged, Dependable 1-Ton Truck, $495

f.o.b. Flint Mich

Remember—this amazing low price includes every basic automotive improvement developed by engineers during the last twelve years. Remember too, that Chevrolet alone offers them in a one-ton chassis for $495.

That's why the Chevrolet One-Ton Truck has won a world-wide reputation for unfailing performance, economical operation and slow depreciation, combined with low first price.

CHEVROLET MOTOR COMPANY, DETROIT, MICH.
Division of General Motors Corporation

Quality Features found only in Chevrolet at these Low Prices

Easy gear shifting, with 3-speed control. Disc-clutch of latest improved design.

Valve-in-head motor that delivers more power and miles per gallon than any other truck engine of equal size.

Positive motor lubrication by a combined pump and splash system.

Positive cooling in all weather by a water pump and extra-large Harrison radiator.

Positive, reliable, semi-reversible steering control.

Extra-large, equalized brakes—12¾-inch diameter drums.

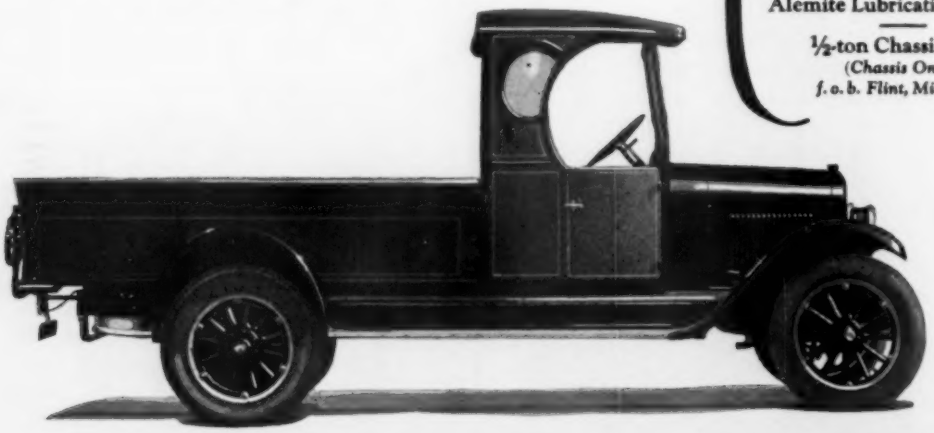
Big, oversize rear axle with spiral-cut, bevel gears.

Semi-elliptic steel springs.

Full length, 177-inch, deep channel steel frame, rigidly braced.

Alemite Lubrication.

½-ton Chassis $375
(Chassis Only)
f. o. b. Flint, Michigan



CHEVROLET

ONE TON **TRUCKS** HALF TON

World's Largest Builder of Gear-shift Cars

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

stimulation and change. They do, indeed, exercise certain of their elemental instincts, but, unfortunately, not those that will conduce to their social development, not those that will make of them better citizens. Quite the contrary. Many of these instincts so cultivated are socially combative and vicious.

When Play Is Introduced into a Prison

Does anyone doubt the prevailing ignorance of true play? Let him, then, watch what happens when play is introduced into a prison. At first the prisoners do not know what to do. Their efforts are childish, and, as is often the case with very young children, their competitions soon become unfriendly and often end in a fight. But how eagerly they take to the innovation, and how soon the better spirit comes! Like the children, again, they learn that a wrong attitude costs them too dearly; and so, for the sake of the play, they learn a new attitude. Surely, one feels, if these boys had only had this socializing experience a little earlier in life, then they might not now be where they are. How significant and sad! We say that they are in prison because they are not social. We might just as truthfully say that they are there because they have never learned how to play.

In a recent survey by Bertha C. Reynolds of four hundred clinic children, 80.5 per cent were found to have suffered their mental or social breakdowns because of something wrong in their homes. And in 87.7 per cent of these the failure was spiritual rather than material, nearly one-half—41 per cent—being just from lack of play. Again, how significant and sad!

An Automobile and a Boy—a Flame and a Moth

Play is an instinct, a compelling instinct. It must find expression. Our juvenile delinquency is more often than not just an aborted play manifestation. Indeed, it may be but play itself—for play is often counted legally as a crime. I have told elsewhere of four boys who were given sentences of sixty days each on a road gang for "shooting craps." Just think of it! Here was a city which provided nothing for its children in the form of play, and yet it sent these boys, who may not have had a criminal thought in their heads, to serve with convicts in a road gang, exposed in their dirty zebra clothing to the gaze of every passer-by. It deliberately condemned these boys to the most vicious of personal contacts, including even all the foul sex practices which prevail in such groups.

Consider automobile stealing. Here is something important—a form of crime that has been largely responsible for the easy acceptance by the public of the idea that we are having a crime wave and that somebody ought to do something about it. We do not object seriously to theft at a distance, to theft that we cannot visualize as ever reaching ourselves, but when it comes so near home as the stealing of automobiles, then we get nervous. But think of this automobile stealing. Some of it is undoubtedly for profit, but much of it is not. Most of it, indeed, is in response to a subconscious urge—and this is true even in many cases where a profit is ultimately sought. Surely the fact that people will mortgage their homes in order to buy a car, that they will go deeply in debt and do without necessities of food and clothing, is significant. From these sacrifices to the sacrifice of honesty is not a long step.

But consider the case of youth alone. An automobile to a boy is not a mere machine. It is a sort of microcosm of joy—a little world of all that he holds most desirable. It makes a noise and is dangerous. It has a wheel to turn, levers to manipulate, and wires to monkey with. But, above all else, it has power, and this power becomes but an extension of himself. Its power is his power; its speed is his speed. It is he who makes it go, and it goes where he wills. An automobile and a boy—a flame and a moth.

Now, what are we going to do about it? For, after all, we should like to hold on to our machines. Well, one state—Massachusetts—has a plan. It proposes to stop these thefts by doing away with its excellent probation service and by increasing the punishment. Just think of it! *It proposes to keep the moths from the flame by removing the fire screen and by making the flame hotter.* But, surely, a better plan would be just to lock the machines and then provide the boys with some other attractions, to make the stealing difficult and to keep the boys busy. Boys can be diverted. Here is a crime which is characteristically part of the play instinct. Let us develop other play. The captain of a gang can be changed into the captain of a team. He will be just as happy—and the neighborhood will be far happier.

But consider, too, those who have already committed the offense. Instead of being a call for the doing away with probation, this automobile stealing is a call for more probation and better. Remember, probation is the one practical effort society has ever made to recover its delinquents—the one constructive phase of the state's whole criminal administration. And remember, too, that probation is for just such

This Model CHPDS 3-ton Autocar dump truck is owned by Mr. Daniel J. Devine, of 688 Rutland Road, Brooklyn, N. Y., who has been using Autocar trucks in his ash-contracting business for more than eight years. He is at present operating three Autocar trucks.

Direct Factory Branches or Affiliated Representatives in 66 cities

*Albany
*Allentown
Altoona
*Atlanta
*Atlantic City
*Baltimore
Binghamton
*Boston
*Bronx
*Brooklyn
*Buffalo
*Camden
*Canton, Ohio
*Charlotte
*Chester
*Chicago
*Cleveland
Columbus
Cumberland
*Dallas
Denver
*Detroit
*Erie
*Fall River
*Fresno
Harrisburg
*Indianapolis
*Jersey City
Lancaster
*Lawrence
*Los Angeles
*Memphis
Miami
*Newark
*New Bedford
*New Haven
*New York
*Norfolk
*Oakland
*Paterson
*Philadelphia
*Pittsburgh
*Providence
*Reading
*Richmond
*Rochester
*Sacramento
*San Diego
*San Francisco
*San Jose
*Schenectady
Scranton
Shamokin
*Springfield
*St. Louis
*Stockton
*Tampa
Utica
*Washington
West Palm Beach
Wheeling
Wilkes-Barre
Williamsport
*Wilmington
*Worcester
York

*Indicates Direct Factory Branch

Autocar performance is a deciding factor

MANY public officials and municipal institutions have decided to purchase their first Autocar as a result of the following investigation: Selecting some names of Autocar users (taken at random from the large list published in the Autocar Public Service Booklet) they wrote the owners, asking for their opinion of Autocar performance.

It is one of the best and most impartial ways of making sure that you are buying the truck that will do your work economically. For those who use Autocars know from their cost records the economies effected by Autocar sturdiness, Autocar compact design and the Direct Factory Branch Service behind the truck.

Try this test yourself by writing us for a free copy of "Sturdy Autocar Trucks in Public Service."

The Autocar Company
ESTABLISHED 1897
Ardmore, Pa.

Autocar Trucks

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

as these, for boys who are not yet hopelessly criminal in habit. Think of it in this way: Here is a precipice, a dangerous place. We make laws. We erect signs. We promise punishment to anyone who falls over. But we have put up no fences and we have provided no guides. And then, at the bottom of the precipice is the probation ambulance service—not very strong as yet, but doing good work. Do not let us forbid this one effort to aid the fallen—that would not prevent these boys from tumbling over.

Playgrounds Keep Children from the Juvenile Courts

I am interested in the prevention of delinquency and I am interested in the salvaging of delinquents. I have given much study to these problems and, as a result of this study, I feel sure that the cultivation of healthful play is one of the first social duties. I know that juvenile delinquency in our large cities increases in direct ratio with the distance from a playground. I know that playgrounds keep children out of the juvenile courts. I know that juvenile delinquency, as I have just been saying, is, in intention at least, but an expression of misdirected play, and I know that this play, when properly directed, prevents this delinquency. I know, too, that even after a child has fallen into crime, it is play that is most useful in recovering him.

In probation work, in the readjustment of those who have started out wrong, the probation officer is often well-nigh helpless unless he can find boys' clubs and playgrounds to assist him. Psychopaths, even, are often best handled through play, and so are the feeble-minded.

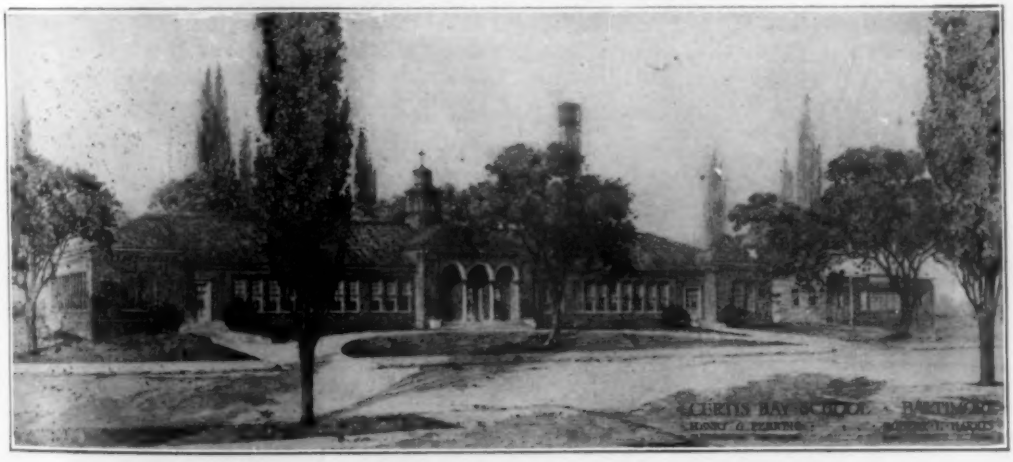
And, finally, I know that in the prison itself, unpleasant as it is to give over our old pleasure of hurting the prisoners, it is, nevertheless, in play alone that these unruly ones often gain their first concept of the social relation, and it is generally through this alone that there can be effected with them any social improvement.

These are demonstrable facts. They are arguments for the play movement, arguments for the need of skilled instruction in the use of leisure, unanswerable arguments. It is because of them that I am hoping most earnestly for the continued and ever mounting success of the community recreation movement. May the public some day come to realize these facts, and then, feeling their full force, take action accordingly.

The Latest Addition to Baltimore's List of New Schools

AN extensive school-building program has been under way in Baltimore this year. Five new structures were completed in the fall, and another school now being erected in the Curtis Bay section of the city will be ready to accommodate approximately 700 children at the opening of the 1927 school term.

The Curtis Bay school, the architect's drawing of which is here reproduced, is an attractive one-story brick building with cast stone trimmings, so designed that the structure may be enlarged at some future time with little difficulty, if such a step is found necessary. The main building will contain four classrooms for general use, a home economics room, a commercial classroom, a health suite, and the administration office. In a separate structure, an electrical shop, a sheet metal shop, and a mechanical drawing room will be accommodated. Provision has also been made in the main building for public baths for men and women. The school site of approximately 6½ acres allows ample space for recreational activities.



The Mark of Quality

The Cleveland Rescue Squad saves lives of people overcome by smoke or gas or rescues unfortunates from the precarious accidents of big cities. This means fast riding day or night. Firestone Gum-Dipped Tires were specified because the squad wanted to be sure to get there in time.

When Human Life Depends on Speed

—those who know depend on Firestone!

They have tested the rugged strength with unusual cushioning which enables them to get there in time with safety and comfort. It is such proved quality that causes fire chiefs to standardize on Firestone. The scientifically designed Non-Skid tread insures positive traction—instant braking response—quick acceleration —security at all times.

Gum-dipping insulates every fiber of every cord with rubber—building greater strength, endurance, stamina. These give the extra mileage that reduces cost. See your Firestone Dealer.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER... Harvey S. Firestone

The Economy of Wide Lots

By Arthur Richards
City Planning Engineer, Altoona, Pa.

THAT city planning and zoning have a direct influence for good on the growth of a city is evident to everyone who has considered the subject. To secure the greatest benefits, however, it is necessary to increase the width of lots over what has been the practice in the past.

This proposition meets with objections from would-be purchasers of lots for residence purposes who consider the price of the wider lots more than they can afford. Generally speaking, a person assumes he will have to pay twice as much for a 50-foot lot as for a 25-foot one, but that is not the case if standard regulations are followed by all subdividers of land. In fact, it is to the advantage of the citizens to insist that no new lots be narrower than 50 feet, assuming that the old width is 25 feet; and if all new subdivisions are made to conform to this rule, the price of the lots will be less than twice the price of the old-size lots.

Assume that ten city blocks on the outskirts of a city are laid out into 25-foot lots, and that no adjoining land is subdivided, because the owners of the land are aware that these ten blocks will accommodate about 320 families—more than the number that will move into the ten blocks within a reasonable time. Inasmuch as these ten blocks with their small lots will accommodate twice as many people as they really should, the subdividing of adjacent land into small lots is retarded, and thus the price of the lots in the ten blocks is kept as high as possible, and of course a 50-foot lot will cost twice as much as a 25-foot one. This is actually the case in several instances known to the writer.

Now if these ten blocks were laid out into 50-foot lots, the capacity would be only 160 families, and the remaining 160 families would have to go elsewhere to secure lots. This would bring into building use land that is vacant or used for minor farm purposes, and would create competition. The owners of this land would be glad of the opportunity to divide it into wide lots and sell each one at possibly 75 per cent of the price charged for two narrow lots in the adjoining subdivision.

It should also be recognized that a strong argument for the economy of the 50-foot lot is that, even though the selling price per front foot were the same as for a 25-foot lot, the developer would have to pay for only one connection for water, sewer, etc., as against the two connections that would have to be paid for if there were two houses placed on the 50-foot lot.

It should be the duty of city officials, whether councilmen or members of city planning commissions, to provide that lots shall be wide enough to accommodate houses of suitable size with a reasonable amount of light, air, and privacy. Most realtors will not voluntarily do this, and thus people are compelled to build on the smaller lots, with resulting congestion and ill-health, and at a higher cost for the lots than is warranted.

In actual operation, most zoning ordinances and platting regulations are effective. Generally, however, there are a few persons in each community who do not wish to abide by any rules, and they are the ones who cause trouble when the time comes to fight the matter out in the courts, as there are technicalities, loopholes, and various other means of evading the real purpose of planning work.

How the City Planning Law Works in Pennsylvania

In Pennsylvania the law provides that all plans for subdivision must be approved by the city planning commission before they can be lawfully recorded. If someone wishes to evade this provision, he can make the lots any shape and size and sell them by "metes and bounds." This, however, is very seldom attemped within city limits, as the law further provides that if a plan of subdivision is not approved by the commission, "no sewer, water, or gas main, or pipes, or other improvement, shall be voted or made within the area under the jurisdiction of the commission, for the use of any purchasers or owners; nor shall any permit for connection with or use of any such improvement existing, or for any other reason made, be given to such purchasers or owners."

Such a drastic provision practically compels every subdivider to submit a plan for approval, and thus the commission has the opportunity to designate the sizes and widths of lots for proper housing conditions. Another precaution, however, must be taken in regard to wide lots so that an owner cannot sell half of his lot and have two dwellings placed upon the

When the budget pinches—

IF your appropriation seems hopelessly inadequate for all it ought and must accomplish—

Talk it over with the Tarvia engineer.

Try figuring on the basis of Tarvia plus The Barrett Company service.

You'll find that this combination makes road funds go farthest—gives the most miles per dollar.

The *Barrett* Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Salt Lake City	Birmingham	Lebanon
Minneapolis	Milwaukee	Bethlehem	Columbus
Youngstown	Syracuse	Toledo	Rochester
Baltimore	Providence		Buffalo

In Canada:

THE BARRETT COMPANY, Limited

Montreal Toronto Winnipeg Vancouver

Tarvia

For Road Construction Repair and Maintenance

lot. This is provided for in most zoning ordinances by regulations pertaining to the use and area of lots, permitting only one dwelling on each lot as shown in the subdivision plans.

The principles of city planning and zoning are exceedingly worth-while, and the development, perfecting, and enforcing of them are essentially within the province of city planning commissions and city officials. The width of lots has such a direct relation to healthful housing conditions, to light, air, and privacy, to enhancing the beauty of residential districts, to maintaining property values by eliminating congestion, that it should be given primary consideration by all who desire the best living conditions for their respective communities.

Compulsory Insurance and Financial Responsibility Laws for Motorists

By Robbins B. Stoeckel

Commissioner of Motor Vehicles for the State of Connecticut

IN several states the so-called "compulsory insurance" law has been praised as being a certain way to secure financial responsibility and consequently more care. For various reasons, but principally on account of the fact that public sentiment is still not widely enough aroused to compel it, such a law has never been passed in complete form, except in Massachusetts. The law which obtains there has not yet actually been administered. It becomes effective January 1, 1927. The subject has been carefully studied there, and there is an excellent report on it by a state committee. The administrator in that state—the Registrar of Motor Vehicles—is prepared to put it into effect and expects it to be useful and efficient. Just how much trouble it will make for registrants in the first year it is hard to estimate, but, however that may be, should it succeed in any measure it will be copied and followed in almost every state, just as the gas tax law has spread all over the United States.

In Connecticut, it has not yet been found possible to agree upon a compulsory insurance law, and a compromise was arrived at, known as the "Financial Responsibility Law," which has been under actual administration since January 1, 1926. This law differs from compulsory insurance in that nobody comes under its jurisdiction until, on account of his own offense (defined in the law as an accident for which he is held responsible, resulting in the death or injury of any person or in damage to property to the extent of at least $100, or as a conviction for reckless driving, operating while intoxicated, or evasion of responsibility) he is required to file a certificate of financial responsibility which shows that he had either taken out a policy of insurance or bond, or filed cash or securities acceptable to the commissioner in the amount of $10,000, covering liability for personal injury, and $1,000, covering liability for property damage.

The Motor Vehicle Department in Connecticut has in the administration of this law taken jurisdiction over some 6,000 registrants and has qualified them. It has taken away many registrations for failure to qualify and refused to allow registration. There has been no difficulty about the administration of this law. It has unquestionably brought the percentage of insured in Connecticut, which originally was much higher than that of any other state—being around 42 per cent—to an even higher rate, and its whole tendency is toward making the most dangerous people financially responsible. It is a law tending towards a compulsory insurance law but not involving its hardships either in universal application or in administration all at once. Whether Connecticut is ready to follow the example of Massachusetts or not will unquestionably be determined in the next Legislature, but eventually there will be compulsory financial responsibility for every one, so that each person on the highway must be financially able, either through the guaranty of a protecting company or on his own certified responsibility, to answer judgments for damage or injury done.

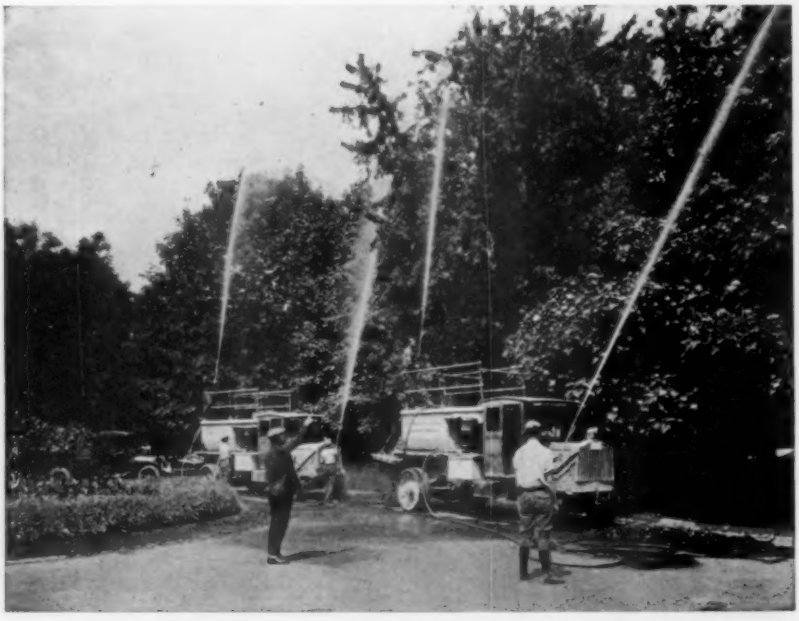
The making of such an insurance or financial responsibility law is an experiment. The great objection to it in legislatures has been that it may compel a state to go into the insurance business, for it would hardly be fair for a state to require something which it cannot itself furnish. This particular law in one or the other of these phases is bound to be considered as a safety law, and each administrator ought to determine from time to time whether his state is ready for a portion or the whole of it.

From a paper on "Administration of a Motor Vehicle Law" presented before the Public Safety Division of the National Safety Council, at Detroit, October 27, 1926.

POWER SPRAYERS

Sprayers That Spray the Highest Trees Without Climbing.

Catalog on Request.



FITZHENRY-GUPTILL COMPANY

135 FIRST STREET, EAST CAMBRIDGE, MASS.

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

City's Liability for Purity of Water-Supply

THAT a city engaged in furnishing drinking water to its inhabitants for profit cannot plead its governmental capacity as a shield against liability for negligently furnishing an unwholesome supply, is a firmly established rule of law. But the trend of judicial authority appears to be against the proposition that, irrespective of negligence, a city impliedly warrants that drinking water furnished by it is wholesome.

As late as October 16, 1925, the Washington Supreme Court affirmed a judgment for plaintiff in the case of Aronson vs. City of Everett, 239 Pacific Reporter, 1011, on account of a death from typhoid fever contracted in drinking contaminated water furnished by the defendant city.

The city unsuccessfully relied upon a decision of the New York Court of Appeals (Canavan vs. Mechanicsville, 128 Northeastern Reporter, 882) and a decision of the Wisconsin Supreme Court (Green vs. Ashland Water Company, 77 Northwestern Reporter, 722). The Washington Court said in its opinion:

"While both cases hold that a city furnishing water to its inhabitants does not impliedly warrant that the same is pure and wholesome, yet both of these cases recognize that the failure to properly inspect the water so as to keep it free from contamination is negligence. There is ample authority that a city engaged in furnishing water, electricity, or other kindred services to its inhabitants for a profit is liable for negligence the same as any private corporation engaged in the same business, that the city does not act in a governmental capacity, and that there is an implied warranty that the water is fit for human consumption. . . . As to which rule should be adopted it is not necessary for us to determine in this action, since we hold the complaint is based upon the ground of negligence and not an implied warranty."

The specific omission on the part of defendant city which was found to be actionably negligent related to a valve through which polluted water passed into the city water-mains. Of this the Washington Supreme Court said in the related case of Roscoe vs. City of Everett, 239 Pacific Reporter, 831:

"The situation here is not parallel with those cases where the chance of pollution is small or incidental, as, for instance, where a city watershed covers a great deal of territory and constant policing would be required to prevent any contamination. In this case, the city permitted water taken from a point close to where city sewers emptied into the river to be pumped into a line which was physically connected with all the users of the district. Nothing but the closed gate could prevent the polluted water reaching the consumers. The ease with which the valve could be sealed or the by-pass removed and the imminent danger to be apprehended by failure so to do are strong factors in the question of the city's negligence. It thus became a question of fact for the jury to determine whether or not the city was negligent."

In the New York case above cited, it was determined by the highest court of the state that "the furnishing of water, through a system of water-works, by a water corporation, either private or municipal, to private consumers, at a fixed compensation, is a sale of goods." And it was held that a city, " in operating a water-works system, distributing water for a price to its inhabitants," "acts in its private or proprietary capacity, in which it is governed by the same rules that apply to a private corporation so acting." But, it does not follow, a majority of the Court held, that the city may be held liable on a theory of implied warranty of wholesomeness, as distinguished from a theory of negligence. It is pointed out that a dealer in ordinary articles of food reasonably may be held to an implied warranty of wholesomeness on account of opportunities for inspection, etc., opportunities not open to a private or municipal corporation operating a water-works system. The Court declared:

"Not infrequently the sole available source is, and is known by the people to be, unceasingly unwholesome, and the water from it can be made safe for human consumption only through mechanical or chemical processes. The sources of supply necessarily drain extended watersheds, the lands of which are used for many and varied purposes. Frequently, even generally, it is physically impossible to patrol and protect them from possible contamination, were it financially practicable. The waters are never in the actual possession and care of the seller. Whether subjected to filtration

ITHACA, NEW YORK

is now applying scientific methods in the revaluation of its Real Estate for tax assessment purposes.

Taxation officials, students and others who may be interested in Somers System methods of appraisal of Land and Buildings for assessment purposes will be welcomed by our representatives in charge of this work at Ithaca. The street unit-foot valuations have already been determined by a Citizens' Appraisal Committee, and the buildings have been measured and described upon appropriate cards. During the month of December our experts will compute the lot valuations and will apply factors of valuation and depreciation of buildings.

If your city, county or state is interested in scientific real estate appraisal for taxation, you will find it well worth while to send a representative to Ithaca some time in December—while the work of community valuation is in progress.

The Manufacturers' Appraisal Company

Established 1899

WALTER W. POLLOCK, PRESIDENT

Philadelphia: 4021 Walnut Street
Cleveland: Plymouth Building
Detroit: Penobscot Building
Pittsburgh: Standard Life Building
New York: 305 Singer Building
Chicago: 903 First National Bank Bldg.
St. Louis: Pierce Building
Atlanta: Glenn Building
Springfield, Mass.: 496 Bridge Street

or purification or not, they are aggregated in outdoor reservoirs. . . . There is no conceivable method in which the corporation can absolutely secure and maintain the water's wholesomeness and freedom from pollution. . . . As a matter of fact, consumers do not, generally speaking, regard the corporation as a warrantor or insurer of the wholesomeness of the water. They expect the company to exercise a high degree of vigilance and faithfulness in their duty to furnish them with wholesome water, but realize that to some extent risk attends its consumption."

Items of Municipal Law

Ordinance Forbidding Pollution of a Town's Source of Water-Supply Upheld

An ordinance of a town, adopted under statutory authority, was held by the Utah Supreme Court to be valid, so far as it forbids permitting cattle, horses, sheep, goats or swine to pollute a stream of water within ten miles above the point where the inhabitants secure their water-supply. The decision was handed down in the case of Town of Ophir vs. Ault, 247 Pacific Reporter, 290, in affirming Ault's conviction for having permitted his sheep to pollute the stream within the prohibited distance.

Cities Are Not Liable to Abutters in Establishing Original Street Grades

The rule that a city may, without liability to the abutting property owners, establish an original grade of a street, although the grade so fixed is different from the natural grade, was reaffirmed by the Court of Appeals for Kentucky in the case of City of Earlington vs. Newton, 285 South Western Reporter, 196.

Cities Have Broad Discretion in Levying Occupation Taxes

In the case of Gillis vs. Croft, 109 Southern Reporter, 446, the Supreme Court of Florida decided that an ordinance of the city of Fort Lauderdale imposing an annual license tax of $250 upon real estate brokers and $100 upon real estate salesmen was not unreasonable. A majority opinion of the Court said:

"Where a municipality has statutory authority to tax occupations without reference to the amounts taxed by state laws, and there is no controlling organic provision, the amounts of the occupation tax imposed may be determined by the municipality, and the courts will not interfere unless the amounts imposed are so unequal and unjustly discriminating in relation to like conditions as to deny the equal protection of the laws, or are so unreasonably large as to be an arbitrary and oppressive exercise of government power. A violation of this rule is not shown."

Right of State to Tax Municipal Property

In the recent case of Commonwealth vs. Philadelphia Rapid Transit Company, 134 Atlantic Reporter, 452, the Supreme Court for Pennsylvania discussed at some length the power of a state to impose a tax upon municipal property. In part, the Court said:

"Municipal corporations may be charged by express enactment, as in the case of real estate owned and not used as an instrumentality of government, but held for private purposes or made the medium of gain or profit; . . . . So, the Legislature may impose a tax on municipal bonds, and direct the payment by the city officials, . . . or may exempt certain classes of such instruments, as those issued in payment of water-works acquired. . . .

"'It is always to be assumed that the general language of statutes is made use of with reference to taxable subjects, and the property of municipalities [when used for governmental purposes] is not in any proper sense taxable.' Pittsburg vs. Sterrett Subdistrict School, 204 Pa. 635, 640, 54 A. 463, 465 (61 L.R.A. 183). But when the charge is against the city possessing or using instrumentalities for other than strictly public purposes, involving the exercise of rights in its private capacity, and the use of property for profit and gain, there is no legal reason why the Legislature may not assess a tax, if it deems such course wise. This distinction has been pointed out in many federal cases."

The concrete point decided by the Court in this case was that defendant, lessee of a transportation line owned by the city of Philadelphia, was liable for the gross receipt tax under the Pennsylvania statute.

City May Be Empowered to Establish and Operate Cemetery Although Outside of Corporate Limits

Sustaining the validity of Tennessee statutes authorizing the establishment and operation of municipal cemteries, the Supreme Court of that state said in the case of Town of Pulaski vs. Ballentine, 284 South Western Reporter, 370:

"A cemetery is quite a common municipal agency, and we think provisions respecting such an agency fall within a general title proposing the incorporation of a municipality. . . .

"We are of the opinion that the operation of a cemetery is a governmental function. Although sentiment is involved, the maintenance of a cemetery is in the interest of the public health and safety just as a park system, the collection of garbage, and the upkeep of a fire department.

"It is settled in this state that a municipality may be empowered to acquire and conduct a park system outside the city limits, and may be likewise empowered to acquire property for its water-works system outside the municipality. The same reasons sustain the power of a municipality to acquire cemetery property beyond the city limits.

"Another objection is made to the act because permission is granted to allow the burial of people in the cemetery who had resided outside the city limits. This will be of benefit to the city, however, in that it will permit the sale of additional cemetery lots. On this principle it was held proper to allow the city schools to take outside pupils for pay."

A little journey through the GAMEWELL FACTORY

Packing and Shipping

FROM the shipping room of our plant fire alarm and police signalling apparatus is sent out to all parts of the globe. It must be loaded on express and freight cars, trucks, ships and other means of transportation by expressmen, longshoremen and even coolies and native laborers. The packing of apparatus for such journeys presents a problem worthy of more than passing attention.

Consider for a moment the nature of the repeater, register, transmitter and box mechanisms and you will realize the care that must be taken in packing to protect them from the shocks and jars encountered in shipping.

Fire alarm boxes are first packed in individual corrugated cartons and then crated together in lots of four, when they are being shipped in quantity lots. These cartons are specially constructed to absorb shocks and jars. Where individual fire alarm boxes are being shipped they are placed in sturdy wooden boxes.

Switchboards of all types represent a great deal of effort and expense, all of which can be rendered useless through damage in shipment. They are therefore packed with great care. Other apparatus presents problems equally as difficult.

Years of experience and continuous vigilance on our part have reduced to a minimum the damage and breakage of apparatus in transit.

THE GAMEWELL COMPANY
NEWTON UPPER FALLS, MASS.
"A Box a Block"

Erection of Billboards, etc., Cannot Be Prohibited on Purely Esthetic Grounds

One's rights to maintain advertising signs on private property cannot be prohibited on esthetic grounds, holds the Nassau County, New York County Court in the recent case of People vs. Wolf, (216 New York Supplement, 741).

The village of Kings Point, N. Y., ordained that no advertisements, etc., should be erected or posted within the village, excepting real estate "for sale" or "for rent" signs, and as to them restricted the size and location. Holding the ordinance to be void, Judge Smith of the County Court found it difficult to determine how the regulation "could promote public convenience or general prosperity." The measure could not be sustained unless it tended to promote the public health, the public safety, the public morals, or the general welfare. It was further ruled by the Court that if the ordinance were otherwise valid, it was vulnerable to the objection of being unjustly discriminatory in permitting "for rent" and "for sale" signs and in forbidding all others. And the opinion notes that billboards, etc., are not to be condemned as necessarily lacking esthetic aspects. Judge Smith said:

"The commercial artist has made great advancement in artistic design of advertising matter, so much so that I think it could not be seriously contended that many of the display advertising signs of the present day do not have a strong appeal to the artistic sense of most people. There are many things on the landscape more offensive to the artistic sense than advertising matter: a slovenly kept lawn or dooryard, dilapidated buildings, untidy and unclean premises, frequently present an appearance quite as shocking to the esthetic sense as any billboard or sign used for advertising purposes.

"Advertising has long been recognized as a legitimate and proper business, and it has also been long recognized that the property owner may use his property for advertising purposes, such privilege being in accord with the right to free use and enjoyment of his property, subject of course to such reasonable restrictions as may be necessary to maintain and promote public health, public safety, public morals, and general welfare."

Municipality Operating Public Utility Outside of Corporate Limits Must First Obtain a Franchise Therefor

That a municipal corporation engaging in an activity beyond its corporate limits may have no greater rights than an ordinary public service corporation is shown by the decision of the Michigan Supreme Court in the case of Bay City Plumbing and Heating Company vs. Lind, 209 North Western Reporter, 579. It was decided in that case that under the Michigan constitution the city of Bay City had no right to install water pipes in an adjacent township without first obtaining permission or a franchise therefor. The Court said:

"While Bay City had the right to acquire, own, and operate a water system within and without its corporate limits, in doing so it was incumbent on it to observe other provisions of the constitution, Michigan constitution, art. 8, sec. 23. It was obligated to observe section 28 of article 8. That section provides that:

"'No person, partnership, association or corporation operating a public utility shall have the right to the use of the highways,' etc., 'without first obtaining a franchise therefor from such city, village or township.'

"A municipal corporation must be included in the word 'corporation,' as there used, especially when the municipality is engaged in public utility construction outside of its own territory. If this were not so, a municipal corporation could sell its surplus power to a manufacturing plant in a neighboring village and erect its poles in that village contrary to the wishes of its inhabitants, and thereby deprive the neighbor of a 'reasonable control of its streets, alleys, and public places.'"

The Region as a New Governmental Unit

THAT the problem of metropolitan government in the United States cannot be divorced from that of the recasting of our whole scheme of areas of local government, is the opinion of Professor Thomas H. Reed of the University of Michigan. In an address before the National Municipal League at its annual convention in St. Louis in November (which will be published in full in the *National Municipal Review*) Professor Reed said in part:

"The township, except in parts of New England, has ceased to be an effective unit of government. It is too small to meet modern demands for good roads, and other services. It should be abolished. The county should become the smallest unit of rural local government. The larger cities, say of 100,000 population or more, may or may not be made counties by themselves. That is a matter on which I do not feel strongly, provided that above the cities and the counties there be instituted a larger unit of government which for want of a better name we may call the 'region,' to care for the large needs of traffic, transportation, water-supply, drainage, health service, etc., which are common to these larger areas. We need no more units of local government than at present. But a county today, with auto-transportation, is no larger than a township fifty years ago. We can therefore slough off the township and take on the region.

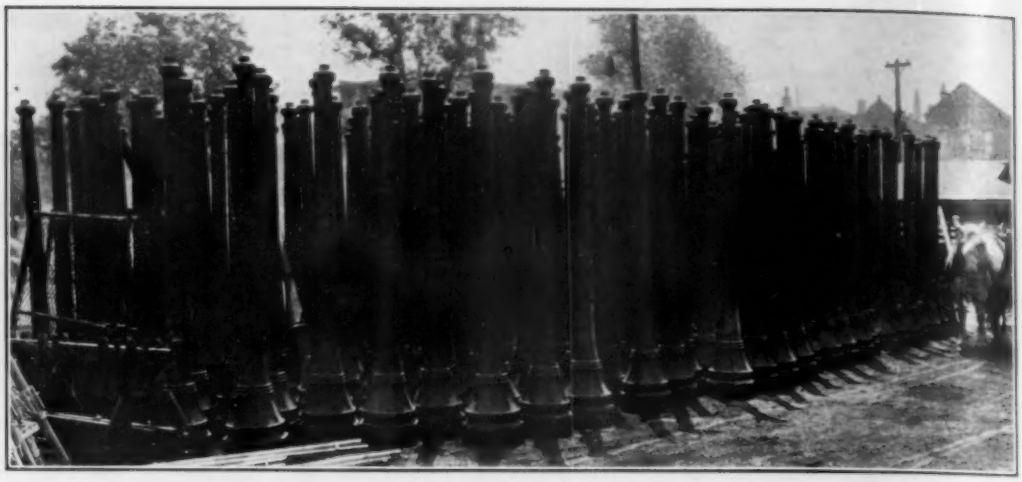
"The evidence of metropolitan experience in Europe and America leads to these conclusions:

"1. The creation of metropolitan commissions for particular purposes is at best a makeshift—to be justified only as such.

"2. A strong municipal authority possessed of general powers of local government, organized for the whole metropolis with a reasonable fringe of unoccupied territory for future development, is the only permanently satisfactory provision for the satisfaction of metropolitan needs.

"3. All such gigantic municipalities must be subdivided into boroughs or districts corresponding as nearly as may be with preexisting municipal units or suburbs of the present city.

"Carrying out these principles must be a matter of compromise and adjustment in each metropolis."



For *Chicago*—Six More Carloads *of* KING STANDARDS

THE City of Chicago, too, is now installing King Ferronite Standards of one-piece construction. The above photograph, taken in a City yard, represents part of a recent order for nine hundred standards.

King Ferronite Standards, because of the features in their manufacture which assure long-time service without continual cost for repairs and replacements, are being accepted universally as the practical lighting system—a combination of the beautiful and efficiently useful.

Scores of cities, large and small, throughout the country are placing King Standards on their streets.

Your city's street lighting should be a long-term investment. Selection of the correct materials can make it such.

KING - GRAYBAR Street Lighting Specialists can assist you in planning "the show window of your city."

Consultation is cost-free; installation is risk-free.

King Design Book No. 100 contains full information on modern street lighting practice. Your copy will be forwarded without obligation upon request.

KING COMPANY

Foremost Manufacturers of Street Lighting Equipment

General Offices: 230 S. Clark Street, Chicago **Factory: Sheffield (Muscle Shoals) Alabama.**

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

Zoning Notes

Prepared by Frank B. Williams

Author of "The Law of City Planning and Zoning"

From data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Ordinances

BIRMINGHAM, ALA.—Ordinance, August 4, 1926
LOWELL, MASS.—Ordinance, July 17, 1926
COHOES, N. Y.—Ordinance, 1926
NORTH TARRYTOWN, N. Y.—Ordinance, 1926

Recent New Jersey Decisions Affecting Garages

NEW JERSEY.—*M. and G. Construction Company and Harry J. Max v. Board of Commissioners of City of Jersey City, Supreme Court,* reported in *New Jersey Advance Reports,* Vol. IV, No. 44, October 30, 1926, p. 864. Mandamus. The zoning ordinance of Jersey City prohibits the erection of group garages for more than five vehicles if any part of such buildings, at the entrance of the same, lies within 150 feet of a church. Held that such a regulation is reasonable. Previous cases to the same effect cited.

NEW JERSEY.—*Savitz-Denbigh Co. v. Bigelow, Superintendent of Buildings, Supreme Court,* reported in 134 Atl. 557. An ordinance prohibiting the erection of a garage or motor vehicle service station within two hundred feet of a school, hospital, church, theater, library or public art museum is a reasonable exercise of the police power.

NEW JERSEY.—*Myslivec v. Bigelow, City Building Superintendent, Supreme Court,* reported in 134 Atl. 551. Mandamus. A zoning ordinance prohibiting the proprietor of a garage from enlarging it in the part of a block zoned for residences is unreasonable where a large part of nearby property is zoned for business.

NEW JERSEY.—*State ex rel. New Jersey Land Company v. City of East Orange, Supreme Court,* reported in *New Jersey Advance Reports,* Vol. IV, No. 44, October 30, 1926, p. 856. Mandamus to compel the issuance of a permit for a building to be used in part as a public garage, contrary to the provisions of a zoning ordinance. In the neighborhood were two-family and apartment houses, a state armory, a group of private garages and a park. *Held,* that the provisions of the ordinance restricting the locality in question against such a building were not unreasonable.

Other Recent Zoning Decisions

NEW JERSEY.—*Pfarr v. Schmidt, Building Inspector of the Town of Irvington, Supreme Court,* reported in *New Jersey Advance Reports,* Vol. IV, No. 44, October 30, 1926, p. 861. Mandamus to compel the issuance of a building permit for stores in a district made residential by a zoning ordinance. *Held,* following the Nutley case, that this provision of the ordinance was void.

It was also urged that the present proceeding was premature because no appeal had been taken to the Board of Adjustment.

Previous to P. L. 1926, p. 526 (the Zoning Law modeled upon the Standard Act prepared by the Department of Commerce, Washington, D. C.), the New Jersey Courts held to the contrary. Under this act, however, in *Chancellor Development Corp. v. Senior,* 4 N. J. Mis. R. 633, this contention was sustained. But in the present case this question is not before the Court; for there is no proof or stipulation of facts showing that the respondent has created a board of adjustment.

NEW JERSEY.—*Franklin Realty and Mortgage Company v. Village of South Orange, Court of Errors and Appeals,* reported in *New Jersey Advance Reports,* Vol. IV, No. 45, November 6, 1926, p. 1860. Mandamus. Permit to erect the building had been refused by the building inspector for the reason that a zoning ordinance forbids the erection of stores and apartments in the district, known as a "Residence A" district, and the setback provision of the ordinance with regard to the district.

Held that the Nutley case controlled, and the permit should issue.

In accord, *Eaton v. Village of South Orange, Court of Errors and Appeals, New Jersey Advance Reports,* Vol. IV, No. 45, Nov. 6, 1926, p. 1859.

This case, in the Supreme Court, to the same effect, which is now sustained in the Court above, was summarized in our previous "Zoning Notes."

OHIO.—*Astor v. Hauck, Court of Appeals,* reported in 153 N. E. 277. When a moving picture theater is permitted in a designated zone under a municipal zoning law, such a building is not per se a nuisance.

United States Supreme Court Sustains Zoning

The Court has decided the well-known "Euclid Village" case, sustaining all the essentials of zoning, including residential districts. The decision is abstracted on page 771 of this issue.

The Skyscraper Controversy

Alvin C. Cass, Esq., has written a most suggestive article entitled "Skyscrapers" in *The Citizen,* a publication issued from 280 Broadway.

Henry H. Curran, counsel for the City Club of New York, has of late been making striking criticisms of the tall building, which have been conspicuously reported in the press throughout the country. Mr. Curran accuses the skyscraper of being the cause of congestion, and an enemy of light and air. Mr. Cass replies that they are not necessarily the one or the other; and that they are certainly a means of providing a measure of concentration which is a great benefit to the city. The earnest seeker for practical measures of reform, so necessary in this matter, will be greatly aided by this controversy, and should neglect neither Mr. Curran's attack, nor Mr. Cass's defense.

After 33 years of service!

Look at this photograph of Main Street, from Lloyd Street to Exchange Street, Buffalo, N. Y.! The whole thoroughfare has changed since 1893—new buildings have been reared skyward, traffic has become constantly heavier—and yet the Trinidad Native-Lake Asphalt pavement is still giving service after 33 years.

Again proving that this nature-made product is justly famous for its long life and low maintenance cost—and it is besides attractive, resilient, easy to keep clean, free from noise, and easy to repair.

Equally famous for *road* building is another of our native-lake products—Bermudez Road Asphalt. May we send you some interesting data?

The Barber Asphalt Company

Philadelphia

New York Chicago Pittsburgh St. Louis
Kansas City San Francisco

TRINIDAD LAKE ASPHALT

Public Utilities

A Department Conducted for THE AMERICAN CITY by Professional Members of the American Public Utilities Bureau, 50 Madison Ave., New York:

JOHN BAUER
Rates and Finance

J. C. BRACKENRIDGE
Railroads

WALTER JACKSON
Street Railways and Busses

GEORGE A. JOHNSON
Water-Supply and Sanitation

LAMAR LYNDON
Electric Light and Power

MANFRED K. TOEPPEN
Telephones

MARK WOLFF
Accounting

Is Professor Ripley Right?

THE newspapers of the country have recently given space to some criticisms of Professor William Z. Ripley's recent attack on public utility holding companies. It is the writer's view that Professor Ripley's analysis* of a situation which, to use his language, has resulted in "prestidigitation, double-shuffling and skulduggery," is both correct and masterful from the standpoint of the uninitiated investor. He could have gone much further in his criticism had he judged the recent juggling of the financial structure of public utilities from the standpoint of rate regulation and its effect on the consumer.

The Management Fee

One of the principal purposes behind the creation of holding companies is to defeat regulation. This may be accomplished by the holding company's imposing a "management fee" based upon percentage of gross earnings and bearing no relation to the actual cost of such services, which are usually highly imaginary. In a recent investigation of the electric rates in a Texas city, made on behalf of the City Council, it was discovered that with the rapid growth of the utility's earnings, a management contract was imposed on it by its holding company, under which a portion of the gross revenues was the consideration. Inasmuch as certain other companies in Texas bearing the same relation to the holding company were not assessed, it was apparent that the principal reason for the assessment was the fact that the local utility was paying 24 per cent dividends on its common stock, a fact which might subject it to a rate case. The imposition of the management fee, of course, reduces the net income, and hides real earnings.

No-Par-Value Stock

Another device is the exchange of the high-dividend-paying common stock for a much larger number of shares of "no-par-value" stock. This often accomplishes two purposes: (1) hides the rate of earnings by converting, for example, 24 per cent dividend on old stock to $2.40 per share of "no-par-value stock"; and (2) hides "water" or "excess capitalization" existing in the financial structure. History is repeating itself, and the days of the early nineties when the economies expected from electric operation were made the occasion for wrecking the street railways of the country, will soon be with us again, if nothing constructive is done to prevent it. We agree with Professor Ripley that the Federal Government should investigate.

Scrambling of Investment and Expense Accounts

Another important purpose of consolidation has also as its fundamental principle the thwarting of rate regulation. Where one company operates in a city, it is a comparatively easy matter for the public authorities of that city to prove that the rates of a given public utility are excessive. But where one consolidated company operates in a multitude of cities with a consequent scrambling of the investment and expense accounts, it is impossible to present proof of excessive rates without laborious apportionments which can only be done at great cost to the public authorities. In the case of a consolidated company operating in a number of cities, it is really necessary for the public officials of all cities served to cooperate, join in the issue, and share the expense of the investigation. This is usually impracticable on account of differences in political parties or factions and very often because of the friendliness to the company of one or more influential officials, whose lack of cooperation is sufficient to block the activities of the larger number willing to do their duty. A notable example is a company in an eastern state serving elec-

* In *The Atlantic Monthly* for November. See page 885.

The plodding truck belongs to yesterday . . . today's truck *rides on air!*

THE clumsy, plodding truck is passing from the highways. Today's truck is here. Travelling with the speed and ease of a passenger car. Travelling on Budd-Michelin Dual Wheels and *pneumatic* tires!

It is a lesson learned from the bus industry. A lesson taught by 60,000 giant buses getting all the advantages of riding on air—and from 15,000 to 20,000 miles to the set of tires. Budd-Michelin Dual Wheels made this possible. Made possible the present development of bus transportation.

Now the heavy truck is getting the same advantages. The trip that was once a matter of days is now a matter of hours. City routes are being covered in shorter time. Trucks are giving miles of extra service, with less wear and tear on loads, roads—and drivers.

Budd-Michelin Dual Wheels have given the heavy truck new possibilities. A new efficiency. A broader use. A wider acceptance. The swing toward Duals is changing truck transportation. Just as it *made* bus transportation.

All manufacturers supply Budd-Michelin Duals either as standard equipment or as optional equipment on every job, or any truck now in use can be converted. Ask any dealer—or write us.

BUDD
WHEEL COMPANY
Detroit

THE BUDD-MICHELIN EQUIPMENT—*two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.*

tricity to many municipalities. An analysis of this company's earnings and comparison with the Public Utility Commission's valuation brought up to date, indicated that it was earning over $4,000,000 in excess of a fair return on the fair value of its property. Although two years have elapsed since this matter was brought to the attention of the public authorities, no readjustment has been ordered. Only recently it has been reported in the newspapers that the company is voluntarily making a substantial reduction in its electric rates, but the public has had no real representation in the matter and most likely will be glad to thank the company for its generosity, even though the reduction may be inadequate under the circumstances.

Sale of Preferred Stock to Consumers

Another method of thwarting regulation is in the sale of preferred stock to consumers of the company. Although this class of investors contribute real cash to the enterprise, they are entitled to limited returns only. On the other hand, the promoters and "managers" usually own the common stock, which, although rarely representing full and true investment, is unlimited as to dividends and very often pays high rates of return. When a rate inquiry threatens, the management loses no time in using as catspaws those consumer-stockholders who happen to be politically or financially influential, to bring pressure to bear where needed, so that the company can continue to earn excessive rates.

Electric companies are given possibly a little too much credit for "maintenance of good service at almost pre-war prices." According to the *Electrical World*, the number of electric consumers on January 1, 1916, was only 4,716,600, while by January 1, 1926, the number had almost quadrupled, to 17,937,160. It is a well-known economic principle that increased volume of business results in decreased unit costs. From investigations made in the past year, I am convinced that of the electric light and power companies which have not made recent substantial reductions in rate schedules, there are few which could not share their prosperity with their consumers by passing on some of these savings in the form of reduced rates.

—MARK WOLFF.

Items of Public Utility News

Ripley Demands Federal Investigation—Criticizes Financial Structures

A comprehensive examination into the whole public utility subject, preferably under the authority of the Federal Power Commission or some other special board temporarily created for the purpose, is urged by William Z. Ripley, professor of economics at Harvard University, in the November issue of *The Atlantic Monthly*. Professor Ripley, whose two previous attacks on corporate practices aroused so much discussion, sharply criticized a number of utility companies for their complicated financial structures through the organization of holding companies and the issuance of several classes of securities, their failure to be more informative in their financial statements to investors, and their sale of non-voting stocks.

Pointing out the wisdom, at least at this juncture, of refraining from advocacy of any particular program, he urges, instead, that "the President recommend to the Congress that provision be made for an exhaustive inquiry, to be prosecuted so as to command the confidence of the entire country." He places as the "downright need of the moment a searching inquiry by real experts, stripped of all political bias and affording a field day for all comers; an open contest, in which the truth, regardless of self-interest, shall prevail."

Electric Industry Doubles in Pennsylvania

The electric industry in Pennsylvania has doubled itself in five years and in the same period has effected a decrease of 12.5 per cent in the sale price per kilowatt-hour, according to figures made public by the Pennsylvania Public Service Information Committee.

The figures are based on a survey representing 85 per cent of the electric sales in the Commonwealth over a period from 1921 to 1925 inclusive. The cost decrease is shown in the following percentages based on 100 for the year 1921:

1921	100 %
1922	94.5%
1923	90.5%
1924	91.5%
1925	87.5%

The figures showing increase in the number of consumers for the same period are:

1921	758,751
1922	886,134
1923	1,085,022
1924	1,256,795
1925	1,418,431

Of the 161,636 new customers connected in 1925, more than 17,000, or 10 per cent, were connected on rural lines.

Ten-Ride Bus Tickets

Further development of modern merchandising methods in the coordinated transporation business is instanced in the recent announcement by the management of the Shore Line Motor Coach Company, joint subsidiary of the Chicago, South Shore & South Bend Railroad and Gary Railways, that bus rates would be reduced nearly 40 per cent in favor of the frequent rider between Gary, Ind., and downtown Chicago.

A new ten-ride bearer commutation ticket rate of $5.50, and proportionately lower rates from intermediate points, was established by the company on October 22 between these two cities. The tickets are transferable and are good for six months from date of sale. The former rate of $1.70 for a round trip and 90 cents one way will

Dollars Earned, Miles Run, and Work Well Done

Graham Brothers Trucks are known the world over for unfailing records of dollars earned, miles run and work well done.

They are quality trucks, built complete in sizes and body styles to fit the needs of your business. They are priced low. They are serviced quickly, skillfully and reasonably by Dodge Brothers dealers everywhere.

The G-B emblem marks a truck that will work well and ably day in and day out, live long, cost little and make money for its owner.

GRAHAM BROTHERS—Detroit
A Division of Dodge Brothers, Inc.

Graham Brothers Trucks, with Dodge Brothers ¾-Ton Commercial Cars, meet 91% of all hauling requirements.

1-TON CHASSIS (G-BOY)		$885
1½-TON CHASSIS		1245
2-TON CHASSIS	(Disc Wheels With Dual Rear, Optional)	1445

f. o. b. Detroit

GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

continue to apply, however, on all single and round-trip tickets to the Chicago "Loop."

Electric Rates Cut on Mississippi Coast

The Mississippi Power Company announces that, effective January 1, standard hydroelectric service will be inaugurated on the Mississippi Coast. The saving to the consumer will be a reduction in the cost of operation of the plants coming under the company's jurisdiction, due to the fact that high-powered lines will carry the "juice" to the different points at which it is used. The new rates will be classified and in such a manner that the general public will benefit thereby.

This reduction would seem to be only a forerunner of further reductions in the near future. When the three large new hotels, Edgewater Gulf, Markham, and Pine Hills, costing $10,000,000, are opened January 1, 1927, it is expected that the 1,000 rooms in these edifices will add materially to the revenues of the Mississippi Power Company. This, together with the steady increase in permanent and resort (both winter and summer) population of the Mississippi Coast, will undoubtedly make for still lower public utility rates.

Lower Rates for Electricity in New Jersey

The Public Service Electric and Gas Company, of New Jersey, has filed with the Board of Public Utility Commissioners a new tariff of electric rates, to take effect with bills rendered in January which, it is estimated, will reduce the bills paid by its electric customers by $1,000,000 a year. For the first 20 kilowatt-hours of lighting current consumed per month the new rate will be 9 cents; next 30 kilowatt-hours, 8 cents; next 700 kilowatt-hours, 7 cents; next 750 kilowatt-hours, 6 cents; next 6,000 kilowatt-hours, 5 cents; next 15,000 kilowatt-hours, 4 cents; and all consumption over 22,500 kilowatt-hours, 3 cents. The minimum charge of $1 per month will be continued as at present.

President Thomas N. McCarter, in announcing the filing of the rate reduction, said:

"The new tariff has been carefully worked out and provides rates that are fair to all classes of users of lighting current. The reduction was possible because of careful and efficient management and constant improvement in plant and equipment. In accordance with the policy adopted when the Public Service Corporation of New Jersey was organized, the benefits that accrue from reduced costs of operation brought about by efficiency in operation of its subsidiary companies have again been shared with Public Service patrons.

"It will continue to be in the future, as in the past, the aim of the Public Service to give the users of the services it provides in nearly 250 New Jersey municipalities, very good service at very low rates."

Fare on New Basis in Jamestown, N. Y.

A weekly pass, entitling the holder to an unlimited number of rides on cars and busses of the Jamestown Street Railway and the Jamestown Motor Bus Transportation Company, went into effect on November 1. The pass sells for $1. On the same day, the new fare schedule on cars and busses in Jamestown went into effect. The new cash fare is 10 cents on busses or cars, but tickets may be purchased at the rate of three for 25 cents or ten for 75 cents. The new rates provides for interchangeable transfers from bus to car or from car to bus. The new fare from Jamestown to Celron or from Falconer to Ashville on the interurban division is 20 cents. Some changes in car routings also have been made on the local lines in Jamestown.

The Municipal Bond Market

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

NOVEMBER was one of the quietest months of the year. New issues were not only few in number but small in size. The final total for the month will fall below the $100,000,000 floated in October by many millions. The Philadelphia issue of $25,000,000 4¼s, sold too late in October to be reported last month, was floated at a net cost to the city of 4.24 per cent.

Although there was little activity in the buying of new issues by investment bankers during November, the bond market in general showed a marked improvement toward the middle of the month. The favorable money rates prevailing and the usual anticipation of year-end reinvestment demand were factors which influenced the movement.

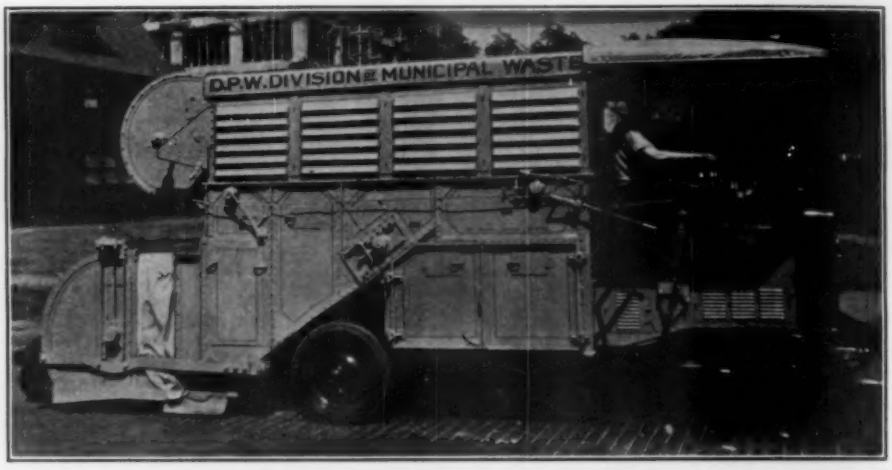
The largest flotation on the horizon at present is a $20,000,000 offering by the state of North Carolina scheduled for early in December. Announcement has been made by the Port of New York Authority that $20,000,000 Hudson River Bridge bonds, secured by revenues emanating from tolls, will be offered at an early date.

The following is a list of important offerings during November, showing the net cost of the loans to the borrowing communities:

Amount	Municipality	Maturity	Interest Rate %	Net Yield %
$593,000	Worcester, Mass.	1927-46	4	3.92
250,000	Delaware	1966	4	4.03
700,000	Schenectady, N. Y.	1927-46	4.10	4.08
346,000	Niagara Falls, N. Y.	1941-63	4.10	4.09
380,000	Green Co., N. Y.	1928-54	4.20	4.17
1,985,000	Newark, N. J.	1927-66	4¼	4.19
300,000	McKees Rocks, Pa., Sch. Dist.	1932-51	4¼	4.24
484,000	Union Co., N. J.	1928-76	4½	4.27
700,000	Jackson, Mich., Union Sch. Dist.	1928-45	4½	4.35
849,000	Englewood, N. J.	1928-63	4½	4.35
348,000	Irondequoit, N. Y., North St. Paul Sewer Dis.	1931-55	5	4.50
871,000	Royal Oak Tp., Mich., Sch. Dist. No. 6	1929-56	4¼	4.51
485,000	San Bernardino Co., Calif., Union Junior College Sch. Dist.	1931-54	4¼	4.62
349,000	Asbury Park, N. J.	1927-39	4¼	4.64
600,000	Harris Co., Texas	1927-56	4¼	4.66
469,000	Hawthorne, N. J.	1928-61	4¼	4.66
5,000,000	Los Angeles Co., Calif., Flood Control Dist.	1927-64	5	4.74
450,000	Lake Co., Fla., Spec. Road & Bridge Dists. Nos. 8 and 9	1931-36	6	6.91

The

Butler Vacuum Street Sweeper in Cold Weather



Many days in the late fall, during the winter and spring when the temperature is freezing and no water can be applied to sweeping—

The BUTLER will do the work.

The BUTLER does not use water—sweeps dustlessly without.

MORE SWEEPING—BETTER WORK.

Investigate—Write

The BUTLER MANUFACTURING CO.

MECHANICAL SWEEPING DEVICES

General Office: Hanna Bldg., Plant: 1810 E. 24th Street, Cleveland, Ohio

DISTRIBUTORS

New York City	Chicago	San Francisco
Pittsburgh	St. Louis, Mo.	Los Angeles, Cal.
Dallas, Texas	Charlotte, N. C.	Philadelphia
Houston, Texas	Atlanta, Ga.	Birmingham, Ala.

Municipal and Civic Publications

Prices do not include postage unless so stated

A Nation Plan—A Basis for Coordinated Physical Development of the United States of America, with a Suggestion for a World Plan.—By Cyrus Kehr. Forewords by Frederic A. Delano, of Washington, and Raymond Unwin, of London. Oxford University Press, American Branch, New York. XVI + 210 quarto pp. Illustrated. $5.00.

The principle presented in this book is that of planning large areas first, thus providing for all major factors, and then fitting in the planning of the smaller features in such a way that population may be better distributed as it increases, land may be put to better use, and communication may be improved. The author applies this principle to the planning of the physical development of the United States. He gives his reasons for concluding that certain benefits would result from carrying out such a plan, and shows what it should include and how it should be prepared and executed. It is intended that the Nation Plan should be strictly national and be under the jurisdiction of the National Government, and that states, counties, and cities should carry out the planning features that would naturally fall under their control. The whole idea is illuminated by the author's statement that years ago, when studying various highway, railway, and city questions, he always observed that the particular matter under consideration was dependent upon other matters territorially outside of it; in other words, that local treatment was not always necessary. This led to the recognition of the interdependence of larger and larger collections of unit areas, and finally to the establishment of the principle that the best physical development is secured by taking as a unit for a general plan the largest single-governmental area through which it is desired to reach and serve all the people. There is a discussion of the more serious defects of our national capital, and suggestions for physical changes and a proposed new form of city government for Washington. The final chapter looks forward to world planning as a basis for establishing world harmony and world peace.

Solving Sewage Problems.—By George W. Fuller and James R. McClintock, Consulting Engineers. McGraw-Hill Book Company, Inc., New York. 1926. X + 548 pp. Diagrams, tables, and illustrations. $6 postpaid.

While Fuller & McClintock, well-known consulting engineers, are named as the authors of this excellent book, the preface credits five other members of their staff and nine well-known engineers in the sewerage field as collaborators, thus giving the book the benefit of wide practice. This single volume is prepared to carry on the history of the art and science of sewage treatment from the point where Fuller's "Sewage Disposal," 1912, left off. In this field development has been so rapid that revision of the earlier text was not considered advisable. The present volume takes up the general preliminary factors necessary in the study of sewage treatment and then devotes successive chapters to the various methods of sewage treatment. The book is well illustrated, and contains many helpful diagrams and tables.

Zoning.—Revised editions of "A Zoning Primer" and "A Standard State Zoning Enabling Act Under Which Municipalities May Adopt Zoning Regulations," both by the Advisory Committee on Zoning appointed by Secretary Hoover. 10 and 13 pp. respectively. 5 cents each. The Division of Building and Housing, Bureau of Standards, Department of Commerce, Washington, D. C., will endeavor to furnish copies of these publications on request, singly or in limited numbers, for members of zoning commissions or committees. (Apply for quantity prices to Government Printing Office, Washington, D. C.)

A Selected Bibliography on Municipal Government in Great Britain.—By William Bennett Munro. Published by the Bureau of Municipal Research at Harvard University. 1926. 16 pp. 50 cents. Covering: History of British Cities; General Descriptions of Present-Day Local Government; Central Control of Borough Government; Suffrage and Elections; Borough Organization; Municipal Law; The Reconstruction of English Borough Government; and Special Phases of Municipal Administration. (Apply to the Bureau.)

Fortschritte der Abwasserreinigung (Advances in Sewage Treatment).—By Karl Imhoff. Published by Carl Heymans, Berlin, Germany. 1926. Second edition. 136 pp. Illustrated. Reviewed by Gordon M. Fair, Assistant Professor of Sanitary Engineering, Harvard University.

The first edition of this little book by one of the leading German sanitary engineers appeared in 1924. Twelve years had elapsed between its publication and that of any other German book on sewage treatment. It was therefore devoted to statements on the development of the art and science of sewage treatment during the intervening period. The rapid progress of treatment methods during recent years has necessitated the addition of important material in a second edition.

The book is divided into three parts which comprise several sections covering the following subject matter:

I. Processes that free sewage from suspended matter and sludge treatment: (1) new sewage screens in America; (2) new construction of Imhoff tanks; (3) two-story tanks or separate sludge digestion; (4) flowing-through digestion compartments; (5) percolation tanks and economic sewage disposal; (6) sewage lagoons; (7) river clarification; (8) storm-water tanks; (9) gas collection from digestion tanks; (10) sludge lagoons; (11) agricultural utilization of sludge.

II. Processes that render sewage stable: (12) biological beds; (12a) submerged biological beds; (13) activated sludge; (13a) interrelation of activation methods; (14) broad irrigation and sand filters; (15) fish ponds; (16) chemical precipitation; (17) chlorination.

III. General: (18) industrial sewage; (19) domestic clarifiers; (20) performance and cost of processes; (21) publications of the author and his co-workers; (22) references used; (23) index.

The little volume as a whole presents a large amount of valuable information in a relatively small space. Sections 5 and 12a describe processes that have not yet been employed in this country. Section 5 deals with shallow tanks or beds much like sludge-drying beds, through which the sewage is passed intermittently. A flowing-through period during which solids are deposited is followed by a draining period during which the accumulated fresh sludge is dried and removed. The process is inexpensive and was used in certain German communities to tide over the period of financial depression. When more elaborate structures such as Imhoff tanks become economically available, the beds are used for sludge-drying. Section 12a describes a submerged filter of coarse material. The filter is aerated by blowing air through it or by arranging its construction so that it revolves in the sewage partly submerged, and partly exposed to the air. Filters of this kind can be suspended in the flowing-through chamber of Imhoff tanks. The material unloading from them then falls into the sludge digestion compartment.

A Brief History of Physical Education.—By Emmett A. Rice, A. M., Normal College of the American Gymnastic Union. A. S. Barnes and Company, New York. 1926. XXIV + 276 pp. Illustrated. $2.00.

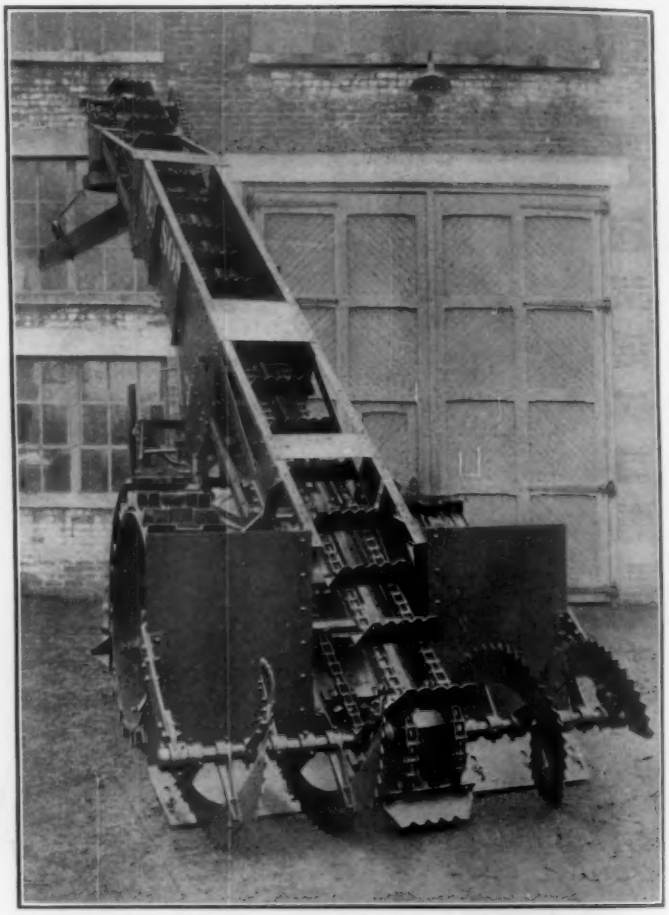
A textbook for students. The history of physical education from earliest times is given, the movement being a part of general education. The last four chapters are: Physical Education in the Elementary and High Schools; Health Education; The Playground Movement; and The Training of Teachers. The author analyzes the social forces that explain the present development of physical education and its highly regarded standing in life.

International Housing and Town Planning Congress.—The report, in two parts, of the papers given at this Congress, which was held in Vienna, September 13 and 14, 1926. Each paper is given in the language in which it was presented—English, French, or German—and is summarized in the other two languages. Among the subjects treated that are of special interest to readers of The American City are: land ownership and control in relation to city and regional planning; single-family versus multi-family housing; and government aid to housing. 286 and 71 pp. respectively. Illustrated. (Apply to H. Chapman, Organizing Secretary, International Federation for Town and Country Planning and Garden Cities, 3 Gray's Inn Place, London, W. C. 1, England.)

There may be TWENTY other Snow Loaders

But how many of them CHOP OUT THE ICE before the scraper hits it?

The NELSON CUTS ITS WAY INTO THE ICE



And the price is 'way below others

N. P. NELSON IRON WORKS, Inc.

822 Bloomfield Ave. **Passaic, N. J.**

Land Planning in the United States for City, State and Nation.—By (Miss) Harlean James, A. B., Secretary of the American Civic Association and the Federated Societies on Planning and Parks. Preface by Richard T. Ely, LL. D., Professor of Economics in Northwestern University. Introduction by Albert Shaw, LL.D. The Macmillan Company, New York. 1926. XXX + 427 pp. Illustrated. $5.00.

This is Volume IX in the Standard Course in Real Estate, outlined by the Joint Commission representing the National Association of Real Estate Boards, the United Y. M. C. A. Schools, and the Institute for Research in Land Economics and Public Utilities. The general theme of the book is broader than that of the usual study of urban planning; it involves a wide sweep of vision and understanding of the future growth and needs of the country as a whole and of its local communities in their relation to one another as to the use of land. It is a study of the fundamentals of economic prosperity, through the history of what has been done to save the country's urban and rural land resources and to coordinate them for the benefit of the entire population. It analyzes the possible progress of the blending of land and population by the most intelligent use of natural assets to meet the constant economic changes. Besides being exceedingly interesting for general readers, the book may serve the use of students, in its arrangement, its broad review of city planning history and procedure, and its comprehensive plans for national and state planning. Selected bibliographies accompany the various sections.

Crime and the Criminal.—By Philip Archibald Parsons, Ph. D., Director of the Portland (Ore.) School of Social Work; and Professor of Applied Sociology, University of Oregon. Alfred A. Knopf, New York. 1926. XVI + 387 pp. $3.00 postpaid.

An introduction to criminology, designed to interest the average citizen by presenting in a non-technical, narrative style the information which he needs, and to give to students enough references for wider reading to make the volume a textbook. Education is proclaimed as the means by which the stupid futility of present methods of dealing with criminals may be remedied—the arousing of public opinion to demand a change and to be willing to pay for it, and then the training of men and women to make the new methods work. Showing why changes are necessary, the author explains past and present ideas about criminals and what is being done to reform or punish them. This involves an analysis of types of criminals and their deeds. The final chapter of the book, The New Conception and Treatment of Crime, presents the outlines of a scientific program for dealing with the problem of the criminal. It open with a summary of society's first reaction to a given crime, and of the usual procedure and treatment, and then suggests specific and general measures looking to the prevention of crime. "The question of the criminal will not be solved as long as proper safeguards are not provided against the pathological members of society, and as long as those without satisfactory attitudes toward society can enjoy a relatively satisfactory existence at or near their accustomed social level."

Kansas City's Public Affairs.—Hereafter, one issue each month of *Public Affairs*, published weekly by the Kansas City (Mo.) Public Service Institute, will be in an enlarged form, as initiated by the issue of October 14, 1926. It is intended to increase the range of subjects treated and to secure a more thorough treatment of the various problems of government studied. The opening article in this number is: Why Bond Issues Fail—Lack of a Comprehensive Program Thoroughly Understood by the People the Chief Reason. Bills of importance to Kansas City to come up before the 1927 Legislature are listed. 16 pp. Illustrated. (Apply to the Institute.)

The Toll of Public Accidents.—A report of the Committee on Public Accident Statistics, 1926, presented to the Public Safety Division, National Safety Council, at the Fifteenth Annual Safety Congress, held at Detroit, Mich., October 26, 1926. 32 pp. Charts, diagrams, tables. Much interesting information is given as to the way the Council's statistical plan is serving public safety in individual communities; 95 to 98 cities and 4 states are now reporting regularly to the Council on street and highway accidents. The prevention of highway accidents depends on measures taken in accordance with the finding of facts. (Apply to the National Safety Council, 108 East Ohio Street, Chicago, Ill.)

Community Games, Stunts and Entertainments for Old and Young.—By Evelyn Simons. Issued by the Paine Publishing Company, Dayton, Ohio. 1926. Handy size. 138 pp. A great variety of enlivening programs for gatherings on special days and miscellaneous occasions. 40 cents. (Apply to the publishers.)

Steel Construction—Allowable Load Tables.—Published and distributed by the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York. 1926. First edition. 104 pp. 50 cents.

This new handbook is intended for the use of engineers, architects, and those who design steel construction, and also for engineering students. The tables are based on an 18,000-pound per square inch stress on extreme fibers of rolled shapes subjected to bending strains and a maximum 15,000-pound fiber stress in columns reduced by formula. These stresses are now allowable in over sixty city and state building codes in the United States and Canada. With a minor exception, they are recommended by the Building Code Committee of the Department of Commerce and are approved by a Joint Committee of the American Society of Civil Engineers and the American Institute of Steel Construction, Inc. The form of the tables of allowable loads for beams and columns is an improvement over any heretofore produced, in that each table includes all of the data pertaining to each structural shape and each type of plain and built-up columns. This form obviates the necessity of referring to different tables as with the handbooks heretofore published. This first edition is a preliminary publication. When certain sections now being developed are on the market and their characteristics determined, they will be included in the second and complete edition. For such shapes as are now on the market, however, this book is a most valuable aid to the designer of steel construction.

The Urban Community.—Selected papers from the Proceedings of the American Sociological Society, 1925, edited by Ernest W. Burgess, Secretary of the Society. The University of Chicago Press, Chicago. 1926. XII + 268 pp. $2.00.

The various papers are presented under the following divisions: Human Nature and the City; Social Biology of City Life; Statistics of the City; Ecology of the City; Typical Studies in Urban Sociology. The introductory paper is by Robert E. Park, President of the Society, who says: "It is because geography, occupation, and all the other factors which determine the distribution of population, determine so irresistibly and fatally the place, the group, and the associates with whom each one of us is bound to live that special relations come to have, for the study of society and human nature, the importance which they do."

Construction of Areas for Sports.—Two articles in *Landscape Architecture* for October, 1926. The Design of Golf Courses, by Karl B. Lohmann; 19 quarto pp., illustrated. The discussion is from the point of view of the more complex development of the country club course, and includes: the choice of property; the clubhouse and its surroundings; and the course and its development. Notes with Reference to the Construction of Areas for Lawn Sports, by Albert D. Taylor; a collection of facts as to the construction and maintenance of areas for clock golf, croquet, golf croquet, lawn tennis, tether tennis, field hockey, archery, roque, quoits, horseshoe pitching, hand tennis; with diagrams. 9 pp. 75 cents. (Apply to Landscape Architecture Publishing Co., 9 Park Street, Boston, Mass.)

Delinquents and Criminals—Their Making and Unmaking.—By William Healy, M. D., and Augusta F. Bronner, Ph. D., Directors, Judge Baker Foundation, Boston. Judge Baker Foundation Publication No. 3. The Macmillan Company, New York. 1926. VIII + 317 pp. $3.50.

The authors of this book have examined large groups of repeated offenders in Boston and Chicago—to discover what lay back of the conduct that brought them into public notice, and whether the measures taken to cure their delinquency were finally effectual, and to what degree. The facts obtained during this work are presented and discussed, and a great need is shown for improvement in ways of seeking to prevent delinquency. Suggestions are made for a "hard-headed, scientific" program of reducing delinquency material.

Industrial Surveys.—Two publications. A survey showing the commercial and finnancial situation as of December 31, 1925, the physical layout, the transportation facilities, and other interesting material about the city and port of New Orleans. Published by the New Orleans Association of Commerce May, 1926. 32 quarto pp. Views, maps. (Apply to the Association.) Industrial Survey of Arkansas City, Kans. 23 loose-leaf pp. Map. (Apply to the Chamber of Commerce.)

Uniform Traffic Ordinance for Colorado Cities.—Drafted by the Legislative Committee of the Colorado Municipal League and reported at the annual convention of the League held at Fort Collins, Colo., May 20, 1926. 8 pp. (Apply to the League, Bureau of Business and Government Research, University of Colorado, Boulder, Colo.)

Break Winter's Grip With Cletrac!

POWER and *speed* are the two most important considerations in selecting tractors for use in snow-removal work.

Nebraska Test Rating on Model A Cletrac

Cletrac Model A "Thirty" has an official Maximum Draw Bar rating of 38.58 Horse-Power at low speed. Model A's official high-speed rating is 4,885 miles per hour. Model A Cletrac excels in the "five ton" and "thirty" classes in both draw bar H. P. and speed ratings.

Model A Cletrac's superior power and speed make it the outstanding crawler tractor for snow-removal work.

Other Exclusive Cletrac Features

Cletrac's patented steering arrangement permitting *constant power on both tracks when turning;* "Snap" lubricating system, one shot type; six-cylinder motor; Manganese steel tracks; Manganese steel drive sprockets; plain lower track wheel bearings requiring no adjustment.

Lower Operating Costs

Cletracs perform "more kinds of work more days in the year" at lower operating costs.

The many exclusive and outstanding qualities in Cletracs make them superior, not only for snow removal, but for dirt moving, road construction, maintenance work and general hauling.

The Cleveland Tractor Company

Cleveland, Ohio

The Cleveland Tractor Co.,
Cleveland, Ohio.

Please send us full information regarding Cletracs.

Name.....

Address.....

.....

The Future Development of the Metropolitan Area Surrounding San Francisco Bay.—By Charles H. Lee, consulting engineer, San Francisco, Calif. Reprinted from *The Bulletin of the Seismological Society of America*, June, 1926. 52 pp. Maps, charts, tables. This paper outlines what might be done to reduce future hazards to life and property from earthquake and earthquake fires in the present and future metropolitan area of San Francisco Bay, by guiding development on the basis of definite community and regional plans, seven specific items of which are elaborated. (Apply to the author, Holbrook Building, San Francisco, Calif.)

Fire Department Rules, New York City.—A new book of rules and regulations has been issued to the Fire Department of New York City, compiled and edited by Captain John J. McCarthy of Hook and Ladder Company 43. As the supply of this book is limited to the needs of the Department, the complete text is being published serially in *Fire Engineering* (225 West 34th Street, New York), through the courtesy of John Kenlon, Chief of the Department. The issue of October 10, 1926, contains a synopsis of the new material in the book, which contains 323 sections as compared with 174 in the old book, issued in 1912. (Apply to *Fire Engineering*.)

The Public and the Motion Picture Industry.—By William Marston Seabury, Former General Counsel to the Motion Picture Board of Trade and the National Association of the Motion Picture Industry. The Macmillan Company, New York. 1926. XIV + 340 pp. $2.50.

The author of this book gives his plan for the commercial reorganization of the motion picture industry on international lines which he believes will make it a great force in the moral, intellectual and cultural development of the people. This involves establishing the motion picture industry as a public utility with equality of market access for any film of merit. After a full discussion of conditions in the industry, a summary is given of the law which has been prepared for submission to Congress.

American Child Health Association.—Transactions of the Third Annual Meeting, held in Atlantic City, N. J. May 17-22, 1926. Published in four parts. Parts I, II, and III contain important papers on various phases of the child health problem. President Hoover's address is in Part III, also the report of the business session, and the reports of affiliated agencies. Part IV contains three plans for community health organization, including standards of health practice which have been adopted in the light of modern experience: plan for a city of 100,000; plan for a city of 50,000; and plan for a county or district health organization. (Apply to the Association, 370 Seventh Avenue, New York.)

Milbank Memorial Fund.—Report for the year ended December 31, 1925, with an account of the New York Health Demonstrations, and including a composite index of the reports for this and for the past three years. 119 pp. Illustrated. After reviewing the work of the year in general, this report presents accounts of the rural health demonstration in Cattaraugus County, New York, the urban health demonstration in Syracuse, and the metropolitan health demonstration in the Bellevue-Yorkville District of the city of New York, and explains the grants of the Fund and the work thereby accomplished. (Apply to Milbank Memorial Fund, 49 Wall Street, New York.)

Fifty Years of the American Library Association.—By George Burwell Utley, Librarian, The Newberry Library. Published 1926 by the Association. An address delivered on March 1, 1926, before the Chicago Literary Club. 29 pp. A most interesting resumé and an inspiring forward look. It is brought out that the main progress in the public use of libraries during fifty years has been in allowing free access to the shelves, and home reading of books. (Apply to the Association, 86 East Randolph Street, Chicago, Ill.)

Dental Hygiene.—The July-August-September, 1926, issue of *The Commonwealth*, published by the Massachusetts Department of Public Health. 93 pp. Important and interesting material on dental hygiene in general, on such activities in Massachusetts, and—especially practical—a symposium of a dozen articles on children's dentistry. (Apply to George H. Bigelow, M.D., Commissioner, State Department of Public Health, Boston, Mass.)

Proposal for Development of Unimproved Land Adjacent to the University of Illinois.—By J. F. Hessel. September, 1926. Published by the Municipal Problems Publishing Co., Champaign, Ill. 16 pp. Illustrated. A tentative design is presented, showing a preliminary outline and a few of the features under consideration, to be treated more in detail in subsequent publications. (Apply to the publishers.)

The Indeterminate Permit in Relation to Home Rule and Municipal Ownership.—By Delos F. Wilcox, Ph.D. Prepared for the Public Ownership League of America. Bulletin No. 35 of the League. June 29, 1926. 99 pp. Dr. Wilcox says: "The indeterminate permit adopted as a means to avoid public ownership is quite effective; but in its usual form it is a delusion and a snare as an opening of the door to public ownership. It opens the door a little, but puts something big and heavy behind it so that public ownership cannot squeeze through. In its typical form the indeterminate permit relieves a company of its worries and leaves the consumers *with* theirs." $2.00. (Apply to Public Ownership League of America, 127 North Dearborn Street, Chicago, Ill.)

Safety Syllabus.—A tentative outline of safety instruction for the kindergarten, grades one to six, and junior and senior high schools, prepared in cooperation with the Cleveland Board of Education, and published September, 1926, by the School Committee of the Cleveland Safety Council for distribution to the 6,000 teachers of the public and parochial schools of Cuyahoga County, Ohio. 93 pp. This aims to present positive rather than negative instructions in safety—"be careful" rather than "don't." Many devices and games are given by which the exceedingly important safety information contained in the pamphlet may be made a part of the child's consciousness. The method of connecting special hazards with the various months is interesting. Up-to-date loose-leaf safety lessons are issued monthly by the Cleveland Safety Council, to be correlated with the instruction in the Syllabus. (Apply to Board of Education, Cleveland, Ohio.)

Recreation Activities in Highland Park, Mich.—A clever little handbook of information about dramatics, winter sports, swimming, competitive games, educational activities, gymnasiums, clubs, Americanization, camps, and playgrounds, in Highland Park, 1926-1927, with miscellaneous details and a list of the staff of the Recreation Commission. The pages are bound at the top. To each division of the subject is given a page, shorter than the one following, so that the names of the divisions, at the bottoms of the pages, form a visual list of the recreational activities. (Apply to the Commission.)

The Primary or Convention—Which?—By Mayo Fesler, Director, The Citizens League of Cleveland. An address before the Detroit Citizens League. An 8-page reprint from the *National Municipal Review*, September, 1926. The author thinks we should have both the primary and the party convention. "A preprimary party convention, followed by the primary, will not only strengthen the party organization and keep it responsive to the public opinion of party members; but it will, in my opinion, more nearly maintain the representative character of our institutions than any method of nomination yet adopted or practiced in this country." (Apply to the National Municipal League, 261 Broadway, New York.)

Libraries and Adult Education.—Report by the American Library Association. 1926. 284 pp. Published by The Macmillan Company, 60 Fifth Avenue, New York. $2.50. A very careful study of the responsibilities and opportunities of libraries in furnishing advice, information, and material to adults in every branch of education activities. This applies to older boys and girls out of school, to industrial workers, university extension, adult classes and part-time schools, voluntary study groups, institutional groups and the blind, art interests and museums, and to special libraries. (Apply to The Macmillan Company.)

The San Francisco Bay Region of the Future—What the Great Regional Plan Means.—By Guy Wilfrid Hayler, Assoc. M. Am. Soc. C. E., planning engineer. Reprinted from the *Daily Commercial News* Annual, 1926, San Francisco, and distributed by the Regional Plan Association, Inc., 803 Phelan Building, San Francisco, Calif. 8 quarto pp. Illustrated. An explanation of the problems of the Bay region that are regional in scope and that influence adjacent areas, with an outline of the way in which the Association plans to attack these problems individually with the idea of incorporating them in a comprehensive scheme. (Apply to the Association.)

Smallpox—A Preventable Disease.—A 16-page pamplet published by the American Association for Medical Progress, 370 Seventh Avenue, New York. Revised edition. Among the new features is a table giving the vaccinal condition of over 10,000 smallpox cases for 1925 taken from the reports of 17 states and the District of Columbia. More than 90 per cent of the 10,000 had never been vaccinated; about 7 per cent had been vaccinated seven to fifty years previously, leaving less than 2 per cent that had been vaccinated within seven years prior to their illness. (Apply to the Association.)

14 Days of Snow Removal Paid For a Barber-Greene

And now $10,275 is added to the appropriation every Winter

During summer months the Barber-Greene Snow Loader can be converted into an efficient bucket loader. In this capacity it loads and batches materials for road and patching work—it handles your sewage sludge and garbage—or any one of a number of odd loading jobs.

Complete details are shown in "Modern Snow Removal." Send for your copy today.

The Barber-Greene that we are talking about is now in its fourth season, saving money for an eastern city.

During the first fourteen days that it worked, four years ago, this Barber-Greene more than paid back its entire original cost.

On an average snow removal season of eighteen ten-hour days, city officials tell us it saves $10,275.

In other words, as soon as this Barber-Greene had worked fourteen days it turned back some $570 into the appropriation for streets and alleys, every day it was on the street.

These savings, which are virtually additions to the appropriation, can be readily converted into street repairs and new streets and alleys next summer.

The Barber-Greene can effect such remarkable dollar and cents savings in snow removal because of two definite things:

First: it eliminates the cost of over 90 men every ten-hour shift it works.

Second: it cuts down the number of trucks required from 20 to 9.

In addition, the Barber-Greene reduces the tremendous losses to retail stores, shipments, and general business the heavy snow storms incur.

And next summer when the money which the Barber-Greene has saved, is being put into streets and alleys, the Barber-Greene can be converted into an efficient bucket loader to handle the gravel or sand. Or it can be put to work loading garbage, sewage sludge and similar materials.

A copy of "Modern Snow Removal" will show you in detail how Barber-Greene Snow Loaders are virtually adding millions to street and alley appropriations through their savings in snow removal—and how they are helping the city to build and repair streets and alleys in summer.

Send for your copy today.

BARBER-GREENE COMPANY—*Representatives in 50 cities*— 515 West Park Avenue, Aurora, Ill.

BARBER GREENE

SNOW LOADERS

PORTABLE BELT CONVEYORS
BUCKET LOADERS

VERTICAL BOOM
DITCHERS

See 1927 ROAD SHOW week of JAN. 10

The Merit System Under the Council-City Manager Government.—By Colonel C. O. Sherrill, City Manager, Cincinnati, Ohio. A paper read before the Pennsylvania Civil Service Association and the National Assembly of Civil Service Commissions, at Philadelphia, September 15, 1926. 4 quarto pp. in *Public Personnel Studies* for November, 1926. "Far from being hostile to civil service methods, the city manager form of government depends largely for its success on the fullest application of the merit system in appointments, promotions, and separations." 50 cents. (Apply to Bureau of Public Personnel Administration, Mills Building, Pennsylvania Avenue at Seventeenth Street, Washington, D. C.)

Massachusetts Planning Laws.—Bulletin No. 20 (October, 1926) of the Massachusetts Federation of Planning Boards. 52 pp. To aid the Planning Boards of Massachusetts there are printed in this bulletin all the more important constitutional provisions and general laws of value in carrying out planning schemes or recommendations, with additions and amendments to and including 1926. Issued as the property of local planning boards, and to be supplemented by the changes and new laws of each session of the Legislature and thus kept up to date. (Apply to Edward T. Hartman, Executive Secretary of the Board, 37 State House, Boston, Mass.)

Billboards on Barns.—"An Appeal to Mr. and Mrs. Farmer," issued by the Woman's National Farm and Garden Association, Inc., 155 East 42nd Street, New York, and the National Committee for Restriction of Outdoor Advertising, 119 East 19th Street, New York. 4 pp. Illustrated. "Many farmers, realizing that the Billboard Crop does not pay in the long run, that it depreciates not only the farm which raises it but also the entire neighborhood, have shown their public spirit by refusing to rent land for billboard purposes." The National Committee offers free of charge "Post No Bills" markers to protect the farmer from the "fly-by-night" sniper who plasters barns with signs without the farmer's knowledge or consent. (Apply to the National Committee for Restriction of Outdoor Advertising.)

Welfare Problems in New York Which Have Been Studied and Reported Upon During the Period from 1915 Through 1925.—By Shelby M. Harrison and Allen Eaton, Department of Surveys and Exhibits, Russell Sage Foundation. Published by the Welfare Council of New York City, 151 Fifth Avenue, New York, for use by the Council and the social agencies of the city. 1926. XII + 84 pp. Providing a convenient short-cut to useful sources of information. Part I contains all the studies that seem to fall under the various divisions of the Council's plan of classification; Part II lists studies and publications bearing indirectly, at least, upon these problems and containing material believed to be of auxiliary assistance. 50 cents. (Apply to the Council.)

Cities Old and New.—Reprints from the *Journal of the American Institute of Architects* for July, August, and September, 1926. In three parts: I—"Cities of the Nth Degree," by Frederick L. Ackerman, and "The Culture-Cycle and City Planning," by Lewis Mumford; II—"The Urban Galaxy of the Hellenistic Age," by Nils Hammarstrand; III—"Science Astray," By Charles Harris Whitaker. 16 quarto pp. in all. 1 illustration. (Apply to Henry Wright, Chairman, Committee on Community Planning, The American Institute of Architects, 56 West 45th Street, New York.)

Diphtheria—Curable and Preventable.—Published by the American Association for Medical Progress, Inc., 370 Seventh Avenue, New York. 12 pp. Graphs. This pamphlet is of especial interest in view of the participation of all health agencies in the drive against diphtheria during September and October. "Medical science has discovered its cause, how it is transmitted, improved methods of diagnosis, a specific treatment, a test of susceptibility, and a sure and harmless method of prevention. This progress is based upon experimentally tested methods and statistically measured results." Single copies, 5 cents; in lots of 100 or more, $2.75. (Apply to Benj. C. Gruenberg, Managing Director of the Association.)

Child Welfare.—The Children's Bureau of the U. S. Department of Labor is publishing popular folders on child welfare, single copies of which may be had free on request. The complete list issued thus far is: Minimum Standards of Prenatal Care; Backyard Playgrounds; Why Drink Milk?; What Builds Babies; Sunlight for Babies; From School to Work; Community Care of Dependent, Delinquent, and Handicapped Children; Breast Feeding. All are illustrated. Prices for quantities will be given on request. (Apply to the Bureau, Washington, D. C.)

Monographs on German Cities.—Edited by Dr. Erwin Stein. Deutcher Kommunal-Verlag G. m. b. H., Berlin-Friedenau, Germany. 1925.

The fourteenth and fifteenth of the series, on the cities of Neisse and Beuthen, in Silesia. Elaborate, high-grade presentations of the business, financial affairs, health conditions, culture, welfare, and administration of these cities, with fine illustrations and detailed text in German. The articles are contributed by authorities in the various departments of municipal and civic life represented. The sixteenth volume in the series has recently appeared, dealing with Waldenburg, Silesia.

Baltimore's New Retirement System.—By George B. Buck, consulting actuary, New York. 6 pp. in the *National Municipal Review* for August, 1926, telling how Baltimore has substituted a sound municipal pension system for various departmental and piecemeal plans. The administration of the retirement system is vested in a board of trustees of five members consisting of the comptroller of the city, two members of the system to be elected by the membership, and two citizens of the city. The benefits cover old age, disability, and death. (Apply to the National Municipal League, 261 Broadway, New York.)

Military Training in the Schools and Colleges of Massachusetts.—Published by The Massachusetts Committee on Militarism in Education, 14 Beacon Street, Boston, Mass. A protest against compulsory military training in the educational institutions of the state. "The authorities of Boston University and the high school principals of the state have initiated the campaign against compulsory military training. Now it is up to the citizens of Massachusetts." 20 pp. (Apply to the Committee.)

"What of the City"—Chicago: Vision—Planning—Promotion—Realization.—By Charles B. Ball, Department of Health, Chicago; Secretary, City Planning Division, American Society of Civil Engineers. Reprint from *City Planning*, January and July, 1926. 41 pp. Illustrated. The progress in carrying out the Plan of Chicago in its various phases is here analyzed and recorded, and the future gains are made real and essential as they are visualized by the author. It is shown that the great expense of the work done in planning and replanning Chicago in the last twenty years is justified by the purely commercial results. (Apply to the author at the address above.)

Stream Pollution by Wastes from By-Product Coke Ovens.—A review, with special reference to methods of disposal. By R. D. Leitch, Associate Chemical Engineer, United States Bureau of Mines. Reprint No. 1042 from the *Public Health Reports*, September 25, 1925. 6 pp. 5 cents. (Apply to Government Printing Office, Washington, D. C.)

Malaria Bearing Mosquitoes Live Because of Man's Own Carelessness.—By William B. Herms, Professor of Parasitology, University of California, Berkeley, Calif. 3 quarto pp. in *The Nation's Health* for August, 1926. Illustrated. Explaining the conditions under which malaria can exist in any given locality and showing common-sense methods of eliminating such conditions. (Apply to The Modern Hospital Publishing Co., Inc., 22 East Ontario Street, Chicago, Ill.)

Southern Commercial Secretaries' Association and Convention School.—Proceedings of the Nineteenth Annual meeting, held in Washington, D. C., May 13-15, 1926. 187 pp. The stenographic reports of the convention, containing much interesting material on various phases of community publicity and community development. (Apply to Chas. M. Ketchum, Secretary-Treasurer of the Association, Greensboro, N. C.)

One Hundred Small Homes.—A portfolio of plans designed by R. C. Hunter & Bro., architects, 501 Fifth Avenue, New York. $2.50 postpaid. Sketches or photographs and first- and second-floor plans of 100 small houses in a great variety of attractive exterior and interior arrangements. (Apply to the architects.)

Laws Governing Municipal Improvements [in Indiana].—By William S. Moore, consulting engineer, South Bend, Ind. A paper presented at the Eleventh Annual Road School, held at Purdue University, January 18-22, 1926. Circular No. 8 of the Engineering Extension Department of Purdue University, Lafayette, Ind. February, 1926. 32 pp. (Apply to the University.)

A Forum of Civics for Houston, Texas.—A 12-page booklet setting forth the principles of the proposed Forum of Civics for Houston, planned to induce combined effort for good citizenship and to engage the expert advice and counsel of the leading minds of the community. (Apply to the Forum.)

A "Caterpillar" Tractor Scenario Entitled GOOD ROADS-

BETTER
QUICKER
CHEAPER

There is a "Caterpillar" Dealer near you

CATERPILLAR TRACTOR CO.

Executive Offices: San Leandro, California, U. S. A.
Sales Offices and Factories:
Peoria, Illinois San Leandro, California
New York Office: 50 Church Street
Successor to
BEST C. L. Best Tractor Co. The Holt Manufacturing Company HOLT

107-1226

I

BUCHANAN COUNTY, Missouri, rebelled against the poor roads resulting from the employment of farmers as road overseers. The farmers were busy with their own fields when road work could be done most effectively. They could only work short days—their own morning and evening chores had to be completed.

II

SO they tried out a number of tractors and finally purchased a 2-Ton "Caterpillar".

III

ON the strength of the performance of this tractor, the County then purchased thirteen additional "Caterpillars".

IV

THE forty-one farmer overseers were replaced by fourteen full time patrolmen (each with a tractor) and two road overseers.

V

THE actual recorded saving during the the first quarter of 1926 was $7,945.38—at the rate of $30,000 a year.

VI

AND ROADS WERE BETTER!

"Caterpillar" Tractor Prices

2-TON . $1850
Peoria, Illinois

5-TON . $3250
Peoria, Illinois

THIRTY $3000
Peoria or San Leandro

SIXTY . $5000
Peoria or San Leandro

CATERPILLAR
REG. U.S. PAT. OFF.

Electric Traffic Signals at Intersections.—Progress Report of the National Highway Traffic Association's Committee on this subject. Printed and distributed by Crouse-Hinds Company, Syracuse, N. Y. 22 quarto pp. Views, diagrams. Describing the methods of operation of the four types of control of electrically illuminated traffic signals—synchronized, progressive, coordinated, and independently operated. See "Operation and Control of Traffic Signal Systems," The American City, November, 1926, pp. 703-708. (Apply to the Crouse-Hinds Company.)

Oil Engine Power-Plant Handbook.—Second edition, 1926. Julius Kuttner, B.Sc., Editor-in-Chief; Roswell H. Ward, Editor; A. B. Newell, and Jack Holley, Associate Editors. Published by Oil Engine Power, 220 West 43nd Street, New York. 288 quarto pp. Illustrated. $5.00. Valuable material on the importance and application of oil engines, their use and operation, and their care and maintenance. (Apply to the publishers.)

Supplement to Report on Use of Elevated Loading Zones or Platforms for Street Car Passengers in Cities.—Issued by the Municipal Reference Library, Chicago. 3 mimeographed pp. (Apply to Frederick Rex, Municipal Reference Librarian, 1005 City Hall, Chicago, Ill.)

Tourist Camps.—Canyon Automobile Camp, Yellowstone National Park. By Isador W. Mendelsohn, Associate Sanitary Engineer, United States Public Health Service. Reprint from the *Public Health Reports*, June 12, 1925. 12 pp. Illustrated. Describing the water-supply, sewerage system, garbage and refuse disposal, mosquito-control measures, stores, service facilities, policing, and management of the Canyon Automobile Camp in Yellowstone National Park. Of particular interest are the rustic type of comfort station and the tables and benches installed in the camp. 5 cents. (Apply to Government Printing Office, Washington, D. C.)

Indiana Engineering Society.—Proceedings of the Society's meetings of 1923, 1924, 1925, and 1926. 290 pp. Illustrated. Containing papers, addresses, and discussions on many engineering problems in the fields of power, street lighting, highway development, transportation, smoke elimination, heating and ventilating, water-softening, etc. 50 cents. (Apply to Charles Brossman, Secretary, Merchants Bank Building, Indianapolis, Ind.)

Reports Received

CHICAGO, ILL.—Annual Report, Civil Service Commission, 1925.
DETROIT, MICH.—Annual Report, Public Schools, year ending June 30, 1926.
MANCHESTER, N. H.—Traffic Rules Department of Highways, 1926.
MARION, OHIO.—Annual Report, Sewage Treatment, 1925.
PHILADELPHIA, PA.—Annual Report, Art Jury, 1925.
PHILADELPHIA, PA.—Annual Report Fairmount Park Art Association, dated January 28, 1926.
SIDNEY, OHIO.—Annual Report, City Auditor, 1925.
TALLAHASSEE, FLA.—Annual Reports, two years ending February 28, 1926.

Conventions—Where and When

DECEMBER 6-9.—NEW YORK
American Society of Mechanical Engineers. Annual meeting. Secretary, Calvin W. Rice, 29 West 39th Street, New York.

DECEMBER 8.—COLORADO SPRINGS, COLO.
State Association of Commercial Organizations of Colorado. Annual convention. Secretary-Manager, Elmore Petersen. Boulder, Colo.

DECEMBER 8-9.—WASHINGTON, D. C.
National Rivers and Harbors Congress. Annual convention. Secretary, S. A. Thompson, 824 Colorado Building, Washington, D. C.

DECEMBER 9.—NEW YORK
American Engineering Standards Committee. Annual meeting. Secretary, P. G. Agnew, 29 West 39th Street, New York.

DECEMBER 9.—WASHINGTON, D. C.
Federated Societies on Planning and Parks. Round Table Conference on Land Uses. Executive Secretary, Miss Harlean James, Union Trust Building, Washington.

DECEMBER 28-31.—ST. LOUIS, MO.
American Sociological Society. Annual meeting. Secretary, E. W. Burgess, Faculty Exchange, University of Chicago, Chicago, Ill.

DECEMBER 28-31.—ST. LOUIS, MO.
National Community Center Association. Annual meeting. Secretary, LeRoy E. Bowman, 503 Kent Hall, Columbia University, New York.

JANUARY 3-15.—SAN JOSE, CALIF.
California Association of Commercial Secretaries. Annual convention. Secretary, Theodore Grady, Jr., Chico, Calif.

JANUARY 10-11.—ST. LOUIS, MO.
International Association of Street Sanitation Officials. Annual conference. Secretary, A. M. Anderson, 10 South La Salle Street, Chicago, Ill.

JANUARY 10-14.—CHICAGO, ILL.
American Road Builders' Association. Annual convention and Road Show. Secretary, Ethel A. Birchland, 37 West 39th Street, New York.

JANUARY 11.—NEW YORK
Society of Terminal Engineers. Annual meeting. Secretary, Charles H. Newman, 30 Church Street, New York.

JANUARY 13-17.—WASHINGTON, D. C.
American Engineering Council. Annual meeting. Executive Secretary, L. W. Wallace, 26 Jackson Place, Washington, D. C.

JANUARY 14-15.—SPRINGFIELD, MASS.
New England Association of Commercial Executives. Meeting. Secretary E. G. Kingsbury, Chamber of Commerce, Stamford, Conn.

JANUARY 17.—NEW YORK
American Institute of Consulting Engineers. Annual meeting. Secretary, P. W. Henry, 111 Broadway, New York.

JANUARY 19-21.—NEW YORK
American Society of Civil Engineers. Annual meeting Secretary, George T. Seabury, 33 West 39th Street, New York.

JANUARY 20.—NORFOLK, VA.
Virginia State Chamber of Commerce. Annual meeting. Managing Director. R. LeRoy Hodges, 708 Grace-American Building, Richmond, Va.

JANUARY 26-28.—ST. LOUIS, MO.
American Society of Heating and Ventilating Engineers. Annual meeting. Secretary, A. V. Hutchinson, 29 West 39th Street, New York.

JANUARY 27.—GREENSBORO, N. C.
North Carolina Commercial Secretaries Association. Annual convention. Secretary, Charles M. Ketchum, Greensboro. N. C.

JANUARY 27.—HARRISBURG, PA.
Pennsylvania State Chamber of Commerce. Annual meeting. Secretary, George E. Foss, State Chamber of Commerce Building, Harrisburg, Pa.

JANUARY 27 AND FEBRUARY 15-17.—MONTREAL AND QUEBEC
Engineering Institute of Canada. Annual meeting. Secretary, R. J. Durley, 176 Mansfield Street, Montreal, Que.

FEBRUARY 7-10.—NEW YORK.
American Institute of Electrical Engineers. Winter convention. Secretary, F. L. Hutchinson, 33 West 39th Street, New York.

FEBRUARY 9-10.—SPRINGFIELD, ILL.
Illinois Municipal League. Annual convention. Secretary, A. D. McLarty, Urbana, Ill.

FEBRUARY 16-18.—ATLANTIC CITY, N. J.
Association of Highway Officials of North Atlantic States. Annual convention. Secretary, A. Lee Grover, State Highway Commission, Trenton, N. J.

FEBRUARY 22-24.—CHICAGO, ILL.
American Concrete Institute. Annual convention. Secretary, Harvey Whipple, 2970 West Grand Boulevard, Detroit, Mich.

FEBRUARY 23-25.—TORONTO, ONT.
Ontario Good Roads Association. Annual meeting. Secretary, T. J. Mahony, 110 University Avenue, Toronto.

FEBRUARY 26-MARCH 3.—DALLAS, TEXAS
Department of Superintendence of National Education Association. Annual meeting. Secretary, S. D. Shankland. 1201 16th Street N. W., Washington, D. C.

APRIL 19-21.—WASHINGTON, D. C.
National Conference on City Planning. Secretary, Flavel Shurtleff, 130 East 22nd Street, New York.

JUNE 6-11.—CHICAGO, ILL.
American Water Works Association. Annual convention. Sec., Beekman C. Little, 43 City Hall, Rochester, N. Y.

JUNE.—PARIS, FRANCE
International Congress of Administrative Sciences. Third meeting. Address: Professor Leonard D. White, University of Chicago, Chicago, Ill.

LINCOLN L HIGHWAY

The is kept snow-free with

H. P. *One-Man Graders*

Many miles of the famous Lincoln Highway are kept snow-free with the H.P. one-man grader. The cost is much lower than the average figure of eighty dollars per mile for road maintenance work during the winter months.

The same equipment can be used for summer work and the same investment is utilized, the year 'round.

Less than two hours is required to change the H.P. summer road patrol machine into a snow-removal machine by the simple addition of lugs.

Unquestionably the H.P. one-man grader is the answer to your troublesome snow removal problems.

Equipment is ready for immediate shipment. Wire at our expense for full information and prices.

H.P. Rigid Rail Tracks
Full Crawlers. Du Pat Scrapers

Cahl Tracks
H.P. Rollers

The Hadfield-Penfield Steel Company, Bucyrus, Ohio

HADFIELD PENFIELD
ONE MAN GRADER

When writing to Advertisers please mention THE AMERICAN CITY—Thank you.

News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Serviceable Combination of Tractor and Snow-Plow

By the use of a Haiss Traxion chassis, a Fordson tractor may be converted into a 2-ton creeper tractor, and when equipped with an 8-foot snow-plow, make an effective unit for the use of contractors or cities in cleaning snow from roads during the winter. The tractor proper has a minor change made in its construction to accommodate the snow-plow. The George Haiss Manufacturing Company, Inc., 143rd Street and Rider Avenue, New York, substitutes a cross-bar instead of the spring, this cross-bar being equipped with two lugs which take the push-bars of the snow-plow.

HAISS-FORDSON WITH GOOD ROADS SNOW-PLOW, SHOWING THE VALUE OF THIS COMBINATION IN SNOW REMOVAL

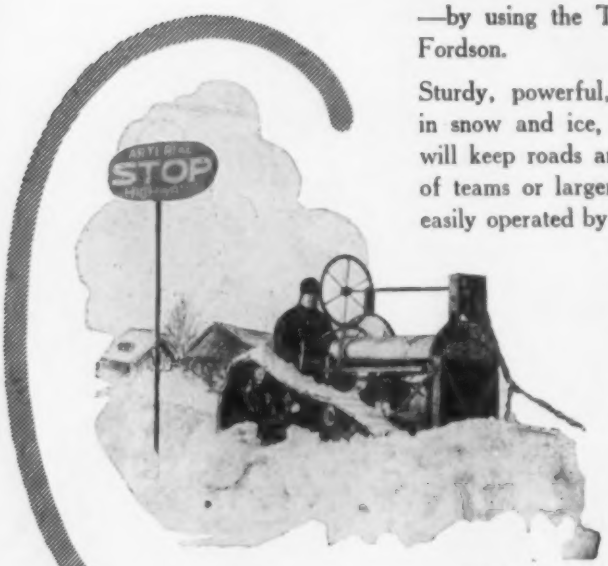
The plow shown in the illustration is an 8-foot snow-plow made especially for this machine by the Good Roads Machinery Company, Kennett Square, Pa. It is equipped with an extended wheel which can be operated by the tractor operator. Tests made last winter show that this device can clear a swath 7 feet wide at the rate of 2 miles per hour. The creeper treads are equipped with angle cleats 2 inches high, but otherwise the tractor is the standard Haiss-Fordson machine. This device consists of steel creeper treads approximately 5 feet 6 inches long and 10 inches wide, connected through sprockets to a channel frame on which the Fordson tractor is mounted. It has a drawbar pull of 15 horsepower and weighs approximately 4,600 pounds complete with the Fordson. It has three speeds forward and one reverse. The machine is steered by brakes adjacent to sprockets on the jackshaft and differential, which is enclosed. This action slows down or stops either of the creepers and permits the opposite track to carry the machine around.

To install a Fordson tractor on a Haiss Traxion chassis, all that is necessary is to remove the front axle and the two rear wheels and place the tractor on the channel frame, which can be done by two men in about two hours. Provision is made to steer the machine through the steering wheel furnished with the tractor, thus making for ease of operation.

New Westinghouse Street-Lighting Engineer

The Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., has announced the appointment of T. C. Randall as Street Lighting Engineer in the Buffalo, N. Y., teritory. Mr. Randall is a graduate of Clarkson College of Technology with a degree in Electrical Engineering.

Cut Snow Removal Costs



—by using the Trackson Full-Crawler equipped Fordson.

Sturdy, powerful, short-turning, and sure-footed in snow and ice, this dependable crawler tractor will keep roads and streets open for half the cost of teams or larger slow-moving tractors. Simple, easily operated by unskilled labor, it never gets out of order. It can be used with several small tractor plows, either wing or A-shaped design.

The low initial cost of this equipment will let you buy and operate three of them in place of one larger tractor plow.

Send for complete information, and then let is arrange for a demonstration.

THE FULL-CRAWLER CO.
Dept. of Geo. H. Smith Steel Casting Co.
518 Clinton Street Milwaukee, Wis.

Trackson Full-Crawler for Fordsons

Baker Snow Plows are made to fit any standard motor truck or leading industrial tractor in either "V" or blade types.

Good Snow Plows

Why take chances? The only way to know a good snow plow is by the past performance. Hundreds of Baker Snow Plows are purchased every year because of the good work they did the winter before. Attach good snow plows to your trucks or tractors. Baker Snow Plows are that kind.

Send for 48-page Catalog No. 235

THE BAKER MANUFACTURING CO.
503 Stanford Ave. Springfield, Ill.

BAKER SNOW PLOWS
for Motor Trucks and Tractors

Protecting Pipe Lines

Widespread study has been given to the subject of protecting water-mains against external corrosion and internal tuberculation. It is interesting to look into the experience of a company which has applied protective coating to approximately 90 per cent of the important steel water-supply systems laid in this country in the last ten years. The Wailes-Dove-Hermiston Corporation, 17 Battery Place, New York, covers its experience in this field in a 44-page book entitled "The Protection of Pipe Lines," which deals with the methods formerly employed in the protection of steel and cast iron mains and the results obtained in applying the bituminous compounds known as "Bitumastic" enamel and "Hermastic" pipe coating.

Beginning with the company's application of Bitumastic enamel to 2,000 feet of steel pipe laid by the New York Board of Water Supply in 1914, applications have been made in connection with some 26 large water-supply systems in all sections of the country. A total of approximately one million and a half lineal feet have been coated in this way. These applications are illustrated and described in the booklet, and the results of service tests are summarized.

The method of applying Bitumastic enamel in the field by melting it in a portable kettle is also described, as well as the application of Hermastic pipe coating by means of a dipping tank, operated in the plant of the pipe manufacturer. Bitumastic enamel is a coating which has been used for more than forty years to protect the inaccessible metal surfaces on ships, dry docks, and other marine structures. It was used to protect the penstocks and lock-gates on the Panama Canal, and has been applied to some 15,000 different marine and naval vessels in all sections of the world. It has also been applied to a considerable extent in industrial fields, and since the introduction of steel pipe for water-mains, oil lines, and gas-mains, it has been used extensively in these fields also.

An Ice Breaker for City Streets

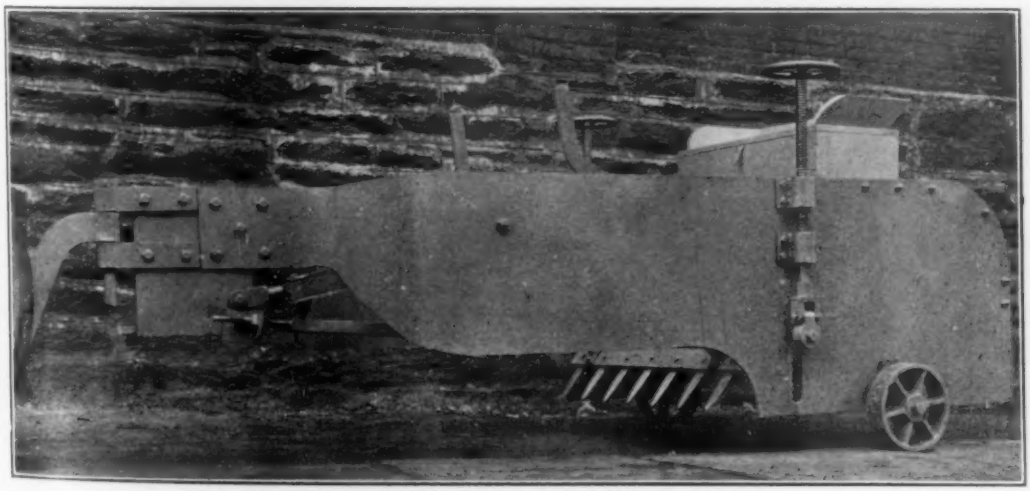
It is no longer necessary to have traffic of any kind completely held up on city streets, as there is available for use with trucks or tractors an ice breaker made by Chas. Hvass & Co., Inc., 508 East 19th Street, New York. A special feature of this ice breaker is the adjustability of the cutter holder bar. Either end of the bar may be raised or lowered to an angle suiting the contour of the roadbed, and the teeth can be so set as to protect the pavement from damage. The Hvass breaker will remove ice up to 8 inches in thickness. It is of rigid construction and can be drawn either by motor truck or by tractor.

The ice breaker was developed to fill the demand for a machine capable of breaking up the layer of ice which covers the street following a heavy fall of snow, a thaw, and then a freeze. This covering of ice may also be caused by constant traffic over the snow, packing it down, as well as from the resultant freezing. Ruts are made on both sides of the street or road by wheels of vehicles. These ruts are a source of danger because vehicles which follow the ruts find it practically impossible to turn out. The Hvass ice breaker is so designed that its V-shaped wheels can run in these ruts and break up the ice between the ruts so that it can be readily removed. This eliminates the pick gang.

The ice breaker can then be used to break up the ice in the center of the road. If necessary, one wheel of the breaker can be in a rut while the other is on top of the ice. In this case the cutter bar is lowered by adjustments on either side, so that cutter and bar is parallel with the street or road. The breaker can also be used for breaking up the ice which forms between the rails of street-railway lines.

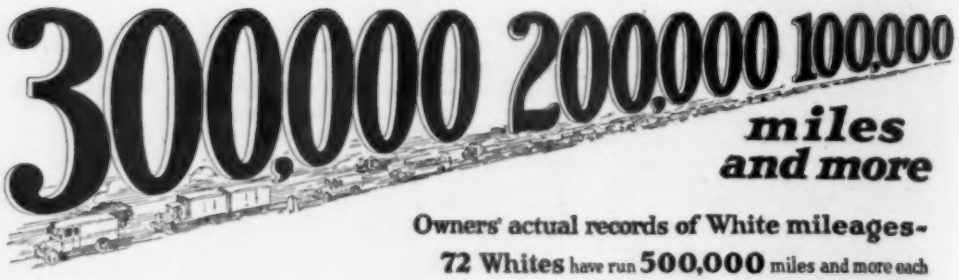
Simplex Factory Manager Sails for Europe

The Simplex Wire & Cable Company, 201 Devonshire Street, Boston, Mass., has announced that Charles R. Boggs, its Factory Manager, has sailed for Europe to remain two months. On November 23, Mr. Boggs, in response to an invitation received a few months ago, presented a paper before the Institution of the Rubber Industry in London, on "Selenium in Rubber Compounds," giving the latest information regarding the selenium method of curing rubber compounds, of which he is the inventor.



THE HVASS ICE BREAKER FOR CITY STREETS

THE AMERICAN CITY



Owners' actual records of White mileages-

72 Whites have run **500,000** miles and more each

384 have run between **300,000** and **500,000** miles each

951 have run between **200,000** and **300,000** miles each

1658 have run between **150,000** and **200,000** miles each

4959 have run between **100,000** and **150,000** miles each

giving the astounding total-

8024 Whites have run **100,000** miles and more each

No owner will operate a truck or bus long enough to run 100,000 miles, unless those miles are *money-earning miles*

100,000 miles—White miles—mean more than an exceptionally long distance; more than an exceedingly durable, well-built, well-serviced motor truck or bus.

They mean unusual profits. They mean net earnings—in excess of all costs. They mean continued earnings long after the original cost has been written off the books.

200,000 miles mean all that—doubled. 300,000 miles mean all that—trebled. So on . . . . Picture the earnings of the scores of Whites that have exceeded 500,000 miles. Then picture what these mileages would mean in your own business, knowing your average mileages for a week or a month or a year.

White 100,000-mile records are not isolated performances, not special achievements under especially favorable conditions. Whites, by the thousand, exceed 100,000 miles with a regularity that makes it standard performance. . . . . All models do it. They do it in all lines of business. They do it everywhere, under all conditions of load, road, weather and climate. They do it in fleets and in single installations.

More than 8,000 Whites have run 100,000 miles and more. More than 1,400 have run 200,000 miles or more. More than 400 have exceeded 300,000 miles. The original cost of most of these 8,024 Whites has been written off the owners' books. . . . . And these mileages are actual owners' figures. They do not include many hundreds of additional Whites that have passed 100,000 miles, but whose owners have not sent us accurate records. Neither do they mirror the splendid earning records of thousands of Whites that have been serving dependably for ten, twelve, fourteen years, carrying their pay loads, without reaching the 100,000-mile mark.

This record, published annually, stands alone. No other truck manufacturer has ever published such a volume of evidence of dependability, long life and continuous earning power. No other truck manufacturer can.

THE WHITE COMPANY, CLEVELAND

Our new "300,000 Miles and More" booklet is just out, with the names of all the owners and the number of Whites each owns in each mileage classification. You will find leaders in all industries, firms in your own line of business, your neighbors, your business associates. We will gladly send the booklet free. Write for it.

Before you buy a truck or a bus see the Whites at any of our 75 factory branches or 500 dealers. There is a White model to meet every transportation need.

Truck Chassis

Model 15	— ¾-Ton	$2,150
Model 20	— 2 -Ton	2,950
Model 51	— 2½-Ton	3,750
Model 40-A	— 3½-Ton	4,350
Model 52	— Heavy Duty	5,100

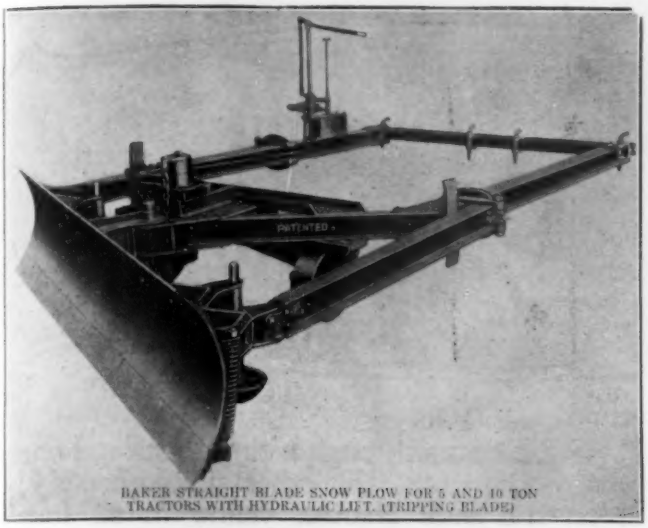
(Several types of power dumping bodies and hoists available)

Bus Chassis

Model 53	16 to 21 passengers	$4,250
Model 50-B	25 to 29 passengers	5,350

(All prices f.o.b. Cleveland)

WHITE TRUCKS
and WHITE BUSSES



BAKER STRAIGHT BLADE SNOW PLOW FOR 5 AND 10 TON TRACTORS WITH HYDRAULIC LIFT. (TRIPPING BLADE)

Snow-Plows for Patrol Systems on City Streets or Suburban Highways

In snow removal, as in any other large undertaking, organization is necessary to get results. Cities, counties, and states are realizing more and more each year that a patrol system in winter is advisable. Definite routes for each snow-plow should be assigned and the men and plows kept in readiness at all times to start moving snow as soon as it reaches a few inches in depth. Enough plows should be used to effectively cover the main traveled roads. Baker straight-blade snow-plows, made by the Baker Manufacturing Company, 503 Stanford Avenue, Springfield, Ill., can be used effectively in such patrol systems, as they are easily handled and are adaptable to many conditions. They are quickly mounted on tractors in emergencies.

The Baker blade snow-plow for 10-ton tractors has heavy adjustable cast steel shoes with rounded base at each end of the moldboard to support it slightly above the surface of the pavement. The heavy moldboard on Baker straight-blade snow-plows is lifted by a standard type hydraulic jack located just back of the moldboard and over the supporting wheels. The piston of the jack is connected by a chain to the moldboard. The jack is operated by a hand pump just outside of the tractor cab and mounted on the plow side-beam. The pump handle is so situated that the driver or operator can reach out from his seat and operate the pump in raising the plow. The release valve used in lowering the plow is also within easy reach. The plows can be raised to the required height in about half a minute, and can be lowered almost instantly.

The fluid used in connection with the hydraulic pump is stored in the supply tank mounted on the plow side-beam adjacent to the pump. The fluid used should be a high-grade non-freezable oil. No part of the hydraulic lift is located on the tractor, and it is built solid on the plow-carrying frame, free from the vibration of the tractor.

The manufacturers claim that the Baker straight-blade snow-plow can be turned on a 16-foot pavement, keeping the carrying wheels on the pavement and the blade up off the ground.

National Water Main Cleaning Company Announcement

The National Water Main Cleaning Company, Hudson Terminal Building, New York, has announced that William H. Thompson & Company, and John Leopold Brodie, Buffalo, N. Y., are representing it in the securing of water-main cleaning business in certain sections of the United States. William H. Thompson & Co., Inc., is also continuing its activities in the sewer cleaning business as heretofore.

Maxim Silencer Company Moves

The Maxim Silencer Company, at Hartford, Conn., manufacturer of scientifically constructed mufflers for gas engines, has moved to its new offices in the Capitol Building, 410 Asylum Street, Hartford, Conn.

New Full-Crawler Representative in Los Angeles

The Full-Crawler Company, 518 Clinton Street, Milwaukee, Wis., has announced the appointment of the B. Hayman Company, Inc., 1918 East Seventh Street, Los Angeles, Calif., as distributors for Trackson Full-Crawlers in the territory formerly covered by the O. R. Peterson Company, Los Angeles. The B. Hayman Company will carry a complete stock of Trackson Full-Crawlers and repair parts.

Allis-Chalmers Announcements

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has announced the opening of a branch office in Jackson, Mich., with L. F. Berry as resident representative. This office, at 512 Reynolds Building, Jackson, is a branch of the Allis-Chalmers Detroit office, which is under the direction of F. S. Schuyler as District Manager.

Ernest Smith has been appointed Sales Engineer in the Oruro, Bolivia, office. This is a branch of the Allis-Chalmers district office at Santiago, Chile. . .

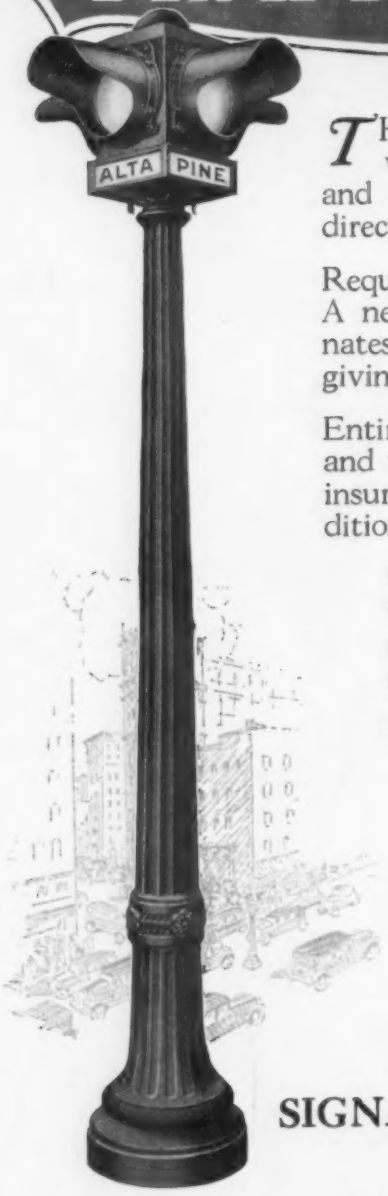
Simplex Moves Florida Office

The Simplex Wire & Cable Company, 210 Devonshire Street, Boston, Mass., has announced the removal of its St. Augustine, Fla., office to the Barnett National Bank Building, Jacksonville, Fla. Miss F. H. Pettee continues as Florida Manager.

Motion Pictures of Asphalt Paving

Two motion pictures, one showing sheet asphalt construction and the other asphalt penetration macadam, are being loaned to cities, civic organzations and contractors by the Texas Company, without charge. Up-to-date methods of constructing sheet asphalt and asphalt macadam pavements are clearly and comprehensively presented. Inquiries should be addressed to the Texas Company, Asphalt Sales Department, 17 Battery Place, New York City.

The Latest Development In TRAFFIC SIGNALS



THREE colors through a single lens, red one way and green the other simultaneously; and on the color change, yellow in all four directions.

Requires only one 100-watt G. E. lamp.
A new and patented lens arrangement eliminates reflectors and prevents the sun-light from giving a phantom (false) indication.

Entire body of signal, as well as lens holders and visors, are made of cast aluminum, which insures years of service under all weather conditions.

Gives a positive and powerful indication; the best so far offered in traffic signals.

Equipped with opal white glass at the base for the name of the street if desired.

Colors do not overlap, causing traffic confusion.

Can be installed and maintained at the minimum cost.

Operates with a tried and proven magnetic mechanism, and is guaranteed to be safe, accurate and dependable.

Offers safety factors not found in any other traffic device.

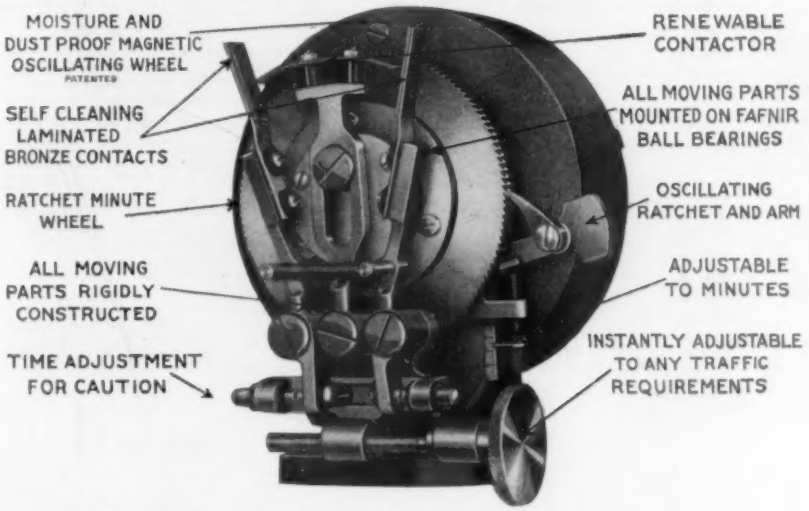
Write today for illustrated literature

SIGNAL AUTOMATIC COMPANY
Louisville, Ky.

A Positive Magnetic TIMING CONTROL

A NEW timer to meet the requirements of the most exacting traffic regulation. Constructed by Engineers, who have used every effort to produce the finest timing control for traffic signals.

The Sun Timer is operated by a magnetic oscillating wheel and does not contain any motor, belt, gear or wormdrive, and yet will give results only obtained on extremely accurate devices.


MOISTURE AND DUST PROOF MAGNETIC OSCILLATING WHEEL
PATENTED
SELF CLEANING LAMINATED BRONZE CONTACTS
RATCHET MINUTE WHEEL
ALL MOVING PARTS RIGIDLY CONSTRUCTED
TIME ADJUSTMENT FOR CAUTION
RENEWABLE CONTACTOR
ALL MOVING PARTS MOUNTED ON FAFNIR BALL BEARINGS
OSCILLATING RATCHET AND ARM
ADJUSTABLE TO MINUTES
INSTANTLY ADJUSTABLE TO ANY TRAFFIC REQUIREMENTS

The principle of this timing device is positively new and has incorporated in it a number of original features not heretofore offered.

"It will cost less than ½c per day to operate."

The rigid and sturdy manner in which the Sun Timer Control is constructed and the quality of materials used in its manufacture, will insure years of constant and faithful service.

Write for further details and descriptive literature

SIGNAL AUTOMATIC COMPANY
Louisville. Ky.

The American City Pamphlets

These are reprints of important articles appearing in past issues of THE AMERICAN CITY MAGAZINE. Please check off the ones you would like to receive, mail the list of numbers to THE AMERICAN CITY, 443 Fourth Avenue, New York, and your selection will be forwarded at the prices given, or the entire set will be sent for $5.00.

CITY PLANNING AND ZONING

115 Chambers of Commerce and City Planning. By George B. Ford. 10 cents.
118 Rose Valley—A Garden Suburb. 10 cents.
153 Planning Street Widths for Street Needs. By Nelson P. Lewis. 10 cents.
157 The Evansville Plan. By H. C. Murphy. 10 cents.
164 The Development of the Industrial Section. By A. P. Hoover. 15 cents.
174 Designing a Complete System of City Thoroughfares. By R. H. Whitten. 15 cents.
183 Legality of Zoning Regulations. 10 cents.
191a Planning a New Town. By R. V. Black. 15 cents.
194 Unchoking Our Congested Streets. 15 cents.
200 Simplifying Zoning. By G. B. Ford. 15 cents.
207 The Topographic Survey and Its Relation to City Engineering Work. By J. R. Pollock. 10 cents.
209 A New Aid in City Planning. By Nelson P. Lewis. 15 cents.
210 Making the City Plan Effective. By Leo J. Buettner. 15 cents.
217 The Aeroplane and City Planning. By Guy Wilfrid Hayler. 15 cents.
218 Putting the City on the Airline. By Archibald Black. 15 cents.
218a The Battle of the Streets. By J. Rowland Bibbins. 20 cents.
223 The Economic Utilization of Land in City Building. By Robert Whitten. 15 cents.

FIRE PREVENTION

105 Fighting Fires Before They Are Lit. By Martin H. Ray. 10 cents.
139 Needed—Adequate Power in Fire Prevention. By C. J. Driscoll. 10 cents.
205 Our Dangerous Schoolhouses. 10 cents.

HEALTH AND SANITATION

119 Public Health Work in Rural Communities. By S. A. Greeley. 15 cents.
136 School Clinics. By E. F. Brown. 10 cents.
142 Preparing to Abolish the Mosquito. 15 cents.
185 An Effective Child Hygiene Program. By Dr. Julius Levy. 20 cents.
192 The Providence Mosquito Campaign. 20 cents.
203 Drug Control. By P. W. Kearney. 20 cents.
211 A Health Exposition in Circus Tents. By Herbert B. Larner. 15 cents.
213 Prostitution: A Community Problem. By C. C. Pierce. 15 cents.
222 Public Health Helps for Municipal Officials. By Carl E. McCombs, M.D. 20 cents.
232 Prostitution—What a City Should Know About Itself. By George E. Worthington. 15 cents.

HOUSING

99 Some Fundamentals of Housing Reform. By Dr. James Ford. 15 cents.
111 Co-Partnership Housing in Great Britain. By Henry Vivian. 15 cents.
160 Ways and Means of Providing Workingmen's Houses. By P. R. MacNeille. 10 cents.
186 Community Values in Government Housing. By George Gove. 20 cents.

LIGHTING AND HEATING SYSTEMS

109 A Notable Development in Ornamental Street Lighting. By W. C. Allen. 10 cents.
184 Modern Lighting Systems. 20 cents.
204 Waste Steam from Electric Light Plant Provides Heat for Arcade, N. Y. 15 cents.
208 The Adequate and Attractive Lighting of City Streets. By A. L. S. Wood. 20 cents.
227 The Boulevard Lighting System of Kalamazoo. By Earl E. Norman. 15 cents.
233 A Street-Lighting Program for the District of Columbia. By John Elliott Wood. 15 cents.

PARKS AND PLAYGROUNDS

106 Planning and Care of Shade Trees. 10 cents.
116 The Modern Park Cemetery. 15 cents.
158 How Much Playground Space Does a City Need? By Rowland Haynes. 15 cents.
197 Playgrounds—How to Get Them. 20 cents.
224 Municipal Golf in a Hundred Cities. By Rebecca B. Rankin. 20 cents.
230 Organizing a City's Play and Recreation Assets. By Jay B. Nash. 20 cents.

ROADS, STREETS AND SIDEWALKS

133 Sheet Asphalt Pavements. 15 cents.
138 Successful Bituminous Macadam Pavements. By Philip P. Sharples. 15 cents.
143 Improved Granite Block Pavements. 15 cents.
169 Prison Labor in Road Construction. By S. M. Williams. 10 cents.
179 Standard Signs for Highways. 20 cents.
189 The Characteristics of Asphalt Sidewalks. By W. E. Rosengarten. 10 cents.
190 Surface Treatments on Macadam and Gravel Roads. By P. P. Sharples. 15 cents.
226 Granite Block Pavements with Asphalt Filler for Heavy-Traffic Streets. By Thomas E. Collins. 15 cents.

STREET CLEANING

148 Hand Flushing. By R. W. Parlin. 15 cents.
154 Infantile Paralysis and Cleanable Streets. By R. H. Bishop, Jr., M.D. 10 cents.

TRANSPORTATION

112 Relation of the Motor Bus to Urban Development. By F. Van Z. Lane. 15 cents.
177 What Shall We Do With the Street Railways? By Delos F. Wilcox. 10 cents.
187 Modern Car Service at Moderate Rates. 20 cents.
191 Motor Busses Aid City Development. 15 cents.

WASTE DISPOSAL

134 How to Avoid Root Growth in House Sewers. By W. R. Marshall. 10 cents.
162 The Small-Town Refuse Problem. 10 cents.
173 Prospectus for a Comprehensive Sewerage System. By Henry W. Taylor. 10 cents.
198 The Municipal Refuse Destructor at Montevideo. By Robert Balmer. 15 cents.
216 Garbage Collection and Disposal in Florence, Italy. 15 cents.
219 The Disposal of Garbage by Incineration in Charleston, W. Va. 15 cents.
220 Garbage Disposal in St. Louis. By C. S. Butts. 20 cents.
221 The Economics of Sewage Disposal. By H. Burdett Cleveland. 15 cents.
228 An Incinerator for Four Residential Communities. By Richard A. Bennett. 15 cents.

WATER SUPPLY AND PURIFICATION

96 Are Water Meters Advantageous? 15 cents.
107 Storage Reservoirs. By G. W. Fuller. 10 cents.
114 Water Supplies and City and County Planning. By C. W. Leavitt, Jr. 15 cents.
129 Water-Works Franchises. 10 cents.
175 Chlorine Compounds. 15 cents.
181 Gravity Water Supplies. 10 cents.
195 Statistics of Metered Cities. 25 cents.
206 Municipal Water Rates. 25 cents.
212 The Business of Water-Works Management. By George A. Johnson. 20 cents.
215 Hydrant Rentals and the Financing of Water-Main Extensions. 25 cents.
225 Planning the Financial Program for the New Water-Works in the Small Town. By Richard Messer. 20 cents.
231 Water Supply Statistics of American Municipalities. $1.00.

MISCELLANEOUS

97 Promoting Thrift by Popularising Municipal Securities. By Henry Bruere. 10 cents.
101 The Esthetic Treatment of City Bridges. 15 cents.
108 The City's Need, the University's Opportunity. By Herman G. James. 10 cents.
122 A Model Wet-Wash Laundry. 10 cents.
123 Combining Municipal and Privately Owned Utilities. By G. B. Baskerville. 10 cents.
130 Engineering Cooperation for Economy in Small Communities. By F. Bass. 10 cents.
135 Organizing School Boys for Accident Prevention. By R. B. Woodward. 10 cents.
152 The Courts and Excess Condemnation. 10 cents.
159 Cooperation Between a Public Library and Civic Clubs. By W. D. Johnston. 10 cents.
161 Building a Community Through Resident Forces. By F. H. T. Ritchie. 20 cents.
171 City Clubs. By W. J. Donald. 25 cents.
199 The Policing of American Cities. By R. B. Fosdick. 15 cents.
201 School Cafeterias. 15 cents.
202 Municipal Policewomen. 15 cents.
Plants. By Arthur L. Mullergren. 15 cents.
214 What Some Mayors Think of Prohibition. 15 cents.
229 Study of Diesel Engines for Municipal Power Plants. By Arthur L. Mullergren. 15 cents.

Simons Brick Co. of Los Angeles, one the world's biggest makers of common brick, have these good words to say about—

International Harvester Trucks *and* Service

INTERNATIONAL HARVESTER CO.
Los Angeles, Calif.

Gentlemen:

We are now using 26 International Motor Trucks in our business which is two-thirds or more of all the trucks we ordinarily use. We are gradually replacing our other makes with Internationals.

There are a number of good reasons for our standardizing on International transportation equipment, but the main one is the excellent service that these trucks have always given us. Our Internationals are always on the job.

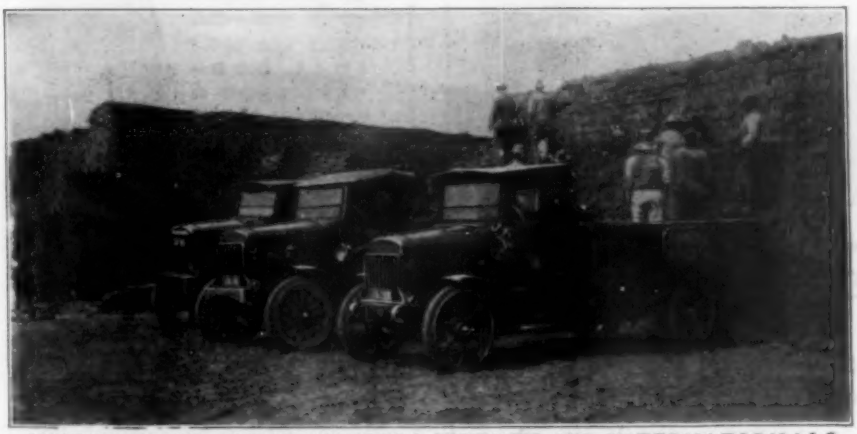
We also like the attention you give your trucks after they are in use. The courtesy extended by the members of your organization in our past dealings is very much appreciated.

Yours truly,
SIMONS BRICK COMPANY (Inc.)
By Walter J. Malone,
Superintendent.

INTERNATIONAL HARVESTER TRUCKS will be *profitable* trucks for *your* hauling. The full line ranges from the Special Delivery and the Speed Truck to the 5-ton Heavy-Duty unit. Served by the world's largest company-owned truck service organization—120 branches in the United States.

Drop us a line for specific information

INTERNATIONAL HARVESTER COMPANY
of America
(*Incorporated*)
606 So. Michigan Avenue Chicago, Illinois



SIMONS BRICK FLEET NUMBERS TWENTY-SIX INTERNATIONALS

How will you keep your streets clear of snow?

Let us suggest a method

THALEG AND HOCK

236 NORTH CLARK ST., CHICAGO, ILL.

POPE

SALT-SPREADER ICE-MELTER

Skidding Insurance at Small Cost

Spreads 300 pounds of salt 8 feet wide one mile long in 5 minutes.

Works automatically, pulled by any automobile truck or pushed along sidewalks by one man.

Send for circular

THE POPE EQUIPMENT CO.

4111 EUCLID AVE., CLEVELAND, OHIO

A New York Attraction!

THE Hotel Martinique register shows the same names many times during the year.

Why?

The sensible, discriminating New York visitor appreciates the Martinique policy — "The Best Without Extravagance."

Clean, comfortable accommodations as low as $2.50 per day—good food—special service—all at the most moderate prices possible.

It's worth your while to investigate. On your next visit—stop in—we'll be glad to welcome you—and prove the comfort, convenience and economy of the Hotel Martinique.

A. E. Singleton
Resident Manager

Hotel

MARTINIQUE

Affiliated with Hotel McAlpin

BROADWAY--32nd to 33rd STREETS

NEW YORK CITY

THE *HVASS* ICE BREAKER

Removes ice up to 8 inches of thickness.
Can be easily attached to truck or tractor.
Does not damage the pavement (Note angle at which teeth are set).
Can be raised or lowered at either end of the cutter holder bar, to suit the contour of the roadbed.

CHAS. HVASS & COMPANY. INC.

Manufacturers of

Motor Truck Street Flushers
Motor Truck Street Sprinklers
Bituminous Distributors
Garbage and Refuse Trailers
Heavy Duty Trailers

Horse Drawn Sprinklers
Horse Drawn Sweepers
Fordson Trailer Sweepers
Air Compressor Outfits
Refuse Wagons

Heating Kettles
Push Brooms
Can Carriers and Cans
Trailer Flushers
Asphalt Plants

WRITE FOR DESCRIPTIVE CATALOG

Office: 508 East 19th St. **New York, N. Y.**

The ACME SNOW PLOW ATTACHMENT

A **light yet powerful** snow handler to fit a medium-weight tractor—

A **rigid steel frame** to relieve the tractor unit of every possible injurious stress—

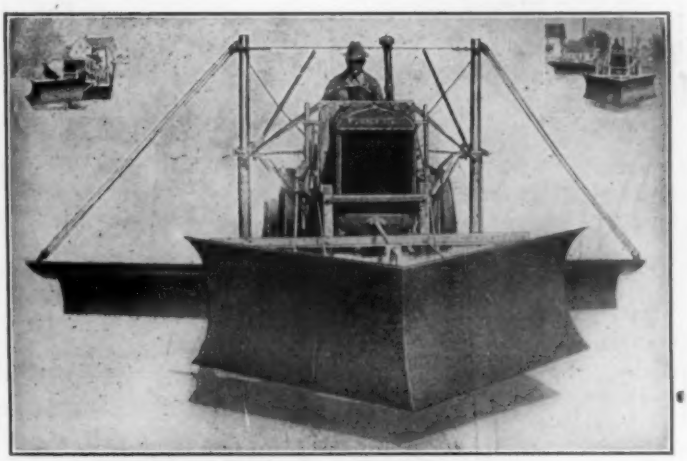
V-plow and adjustable side wings—

Low center of gravity and perfect balance, which prevents slewing and makes it easy for the driver to steer in any direction—

A **scarifier** at the rear for breaking up the ice on the roads—

Are not these points worth considering?

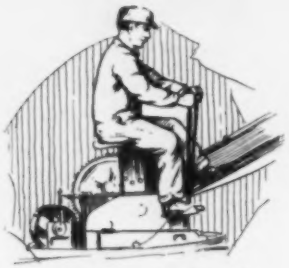
For further information see Bulletin No. 126



THE ACME ROAD MACHY. CO.

FRANKFORT, NEW YORK

WILFORD



One-man operation for digging and moving shovel.

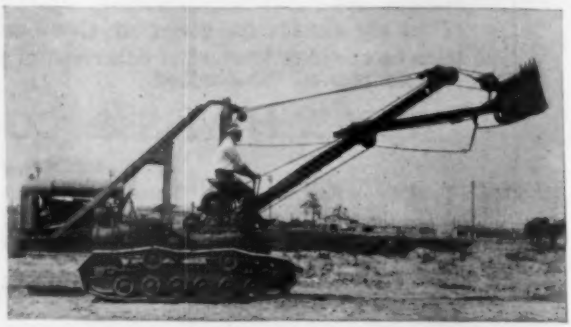
Every Ford dealer can supply or secure replacement parts quickly and economically.

Low Operating Cost

You'll like the performance of this Fordson powered shovel. Low initial cost, low operating cost, high daily output, powerful crowding action, high mobility and one-man operation. Built for service and quickly serviced in any city in the country.

Write today for specifications and illustrated literature.

UNIVERSAL POWER SHOVEL CO.
WILLIAM FORD, President
15841 Second Blvd. Detroit Mich.



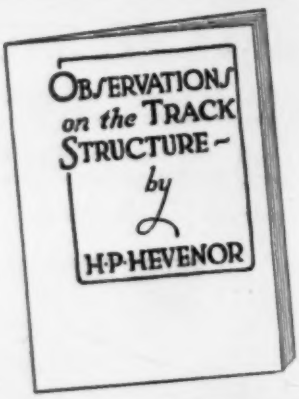
The Andresen Road Repair Outfit

LITTLEFORD
TAR AND ASPHALT
HEATERS

The quality line will be ready for your personal inspection at the Road Show.

Coliseum
Booth Number
N. C. 31
Jan. 10 to 14
Don't fail to see it.

LITTLEFORD BROS.
500 East Pearl St.,
CINCINNATI OHIO



A Consulting Engineer on Paved Track in City Streets—

A non-technical discussion by a track specialist of the relative merits of various designs of modern paved track construction

We will be pleased to mail a copy of this booklet to interested Mayors, City Engineers or other officials

THE INTERNATIONAL STEEL TIE COMPANY
16702 Waterloo Road Cleveland, Ohio

Discovered real tire service by standardizing on Kellys

CHARLEROI LUMBER COMPANY
Contractors and Builders
WALTER SVERLY, MGR
CHARLEROI, PA.

March 27th, 1926.

Kelly-Springfield Tire Co.,
250 West 57th St.,
New York, N.Y.

Gentlemen:

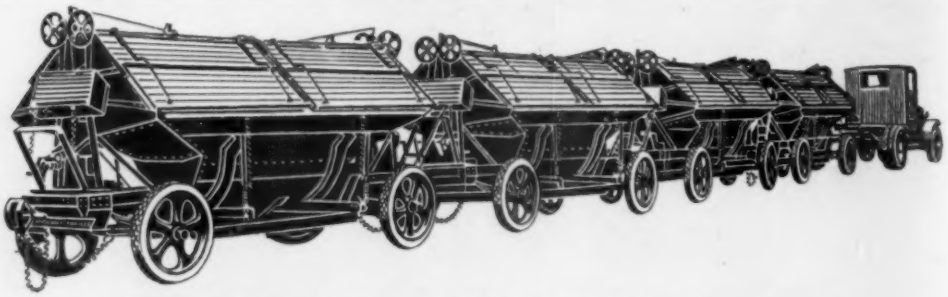
We have been using solid truck tires for ten to twelve years. For a number of years we tried first one make and then another, trying to find a tire that would give consistent good service. We got some pretty good tires but it was not until we standardized on Kelly-Springfield Tires exclusively that we discovered what real tire service could be.

We are using Kelly-Springfield Tires on our entire fleet at the present time and getting from twelve to eighteen months steady hard service from them, which we consider all that could be expected.

It is always a pleasure to say a good word for a good product and we can sincerely say that good word for Kelly-Springfield Tires.

Yours truly,
Charleroi Lumber Co.,
Glenn R. Lyons
Treas.

KELLY-SPRINGFIELD TIRES



HIGHWAY DROP-FRAME TRAILERS

with SANITARY METAL COVERS for

GARBAGE and ASH TRAILERS

Cut down the food and fun for flies, prevent the wind's blowing ashes over the street and sidewalk, obliterate from view unsightly scenes of scavenger work—and eliminate sickening, obnoxious odors so common to many cities.

Highway Trailers equipped with METAL COVERS will keep your city clean, beautiful and sanitary.

$2,000,000.00 worth of this type of Trailer in Daily Use

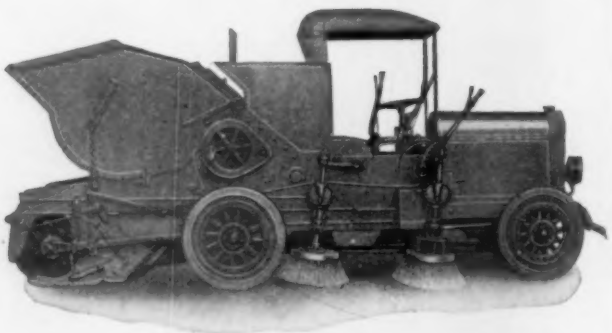
HIGHWAY TRAILER COMPANY Edgerton, Wisconsin, U. S. A.

THE LARGEST TRAILER PLANT IN THE WORLD

THE

Kinney
TRADE MARK
REG. U.S. PAT. OFF.

MOTOR PICK-UP STREET SWEEPER



A CLEAN SWEEP—A CLEAN STREET—A CLEAN CITY

Cleanly swept streets are a source of civic pride. They are indispensable to public health and enjoyment. The Kinney-Springfield motor pick-up sweeper covers all the most exacting requirements of up-to-date sanitary street cleaning by the method of sweeping and is the most economical and efficient method of street cleanliness.

Write for our descriptive catalog.

KINNEY MANUFACTURING COMPANY

BOSTON, MASS.

New York, Chicago, Philadelphia, San Francisco, Houston, Los Angeles, Kansas City

$6000 saved
in labor alone by using

SOLVAY
Calcium Chloride

Contractors and engineers everywhere are saving time and money by using Solvay Flake Calcium Chloride with Portland Cement in all concrete construction work.

Solvay is of tremendous advantage for cold weather use. It lowers the freezing point of the gauging water, generates heat and cuts in half the setting time. It also produces early tensile strength and increases the ultimate or final strength.

In cold weather, in any weather, Solvay Flake Calcium Chloride will improve your concrete work and save time and money.

Solvay is not an experiment—it is a proven success! It is a standard product made by one of America's great manufacturers. The use of Calcium Chloride in concrete construction has the indorsement of the Portland Cement Association and other leading authorities.

Solvay Flake Calcium Chloride is shipped in 100 lb. moisture-proof bags and in non-returnable metal drums of 375 lbs. net. Seventy-five conveniently located distributing points insure prompt delivery with minimum transportation charges.

Send for the interesting illustrated Solvay Booklet—it's free for the asking and gives you the very latest information about this interesting subject.

Mail to-day

THE SOLVAY PROCESS COMPANY
Wing & Evans Inc., Sales Dept.
40 Rector Street, New York

Please send me copy of Booklet No. 1053 "Solvay Calcium Chloride in Concrete Construction."

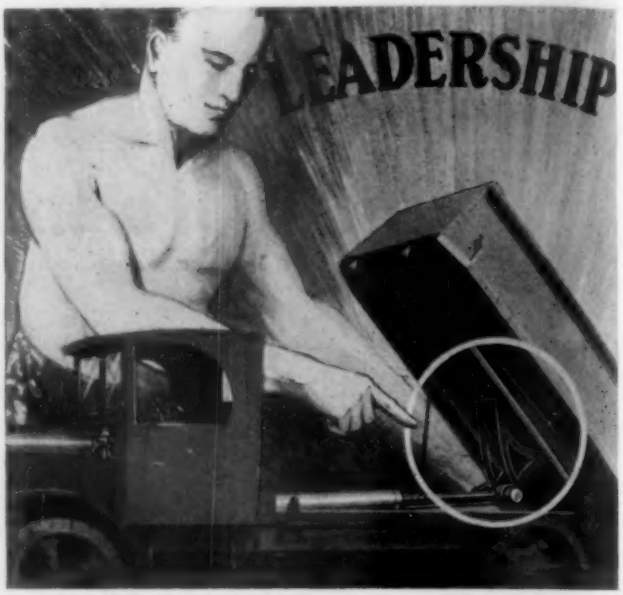
Name .....
Address .....
City .....
State .....

MUNICIPAL Engineers and Contractors everywhere know the intrinsic value of Wood performance and dependable service.

WOOD HYDRAULIC

Hoists and Steel Bodies

Wood Hydraulic Hoists are the Recognized Standard the World over, wherever Loads are Dumped or Roads are Built.



Write for Catalog and illustrated folder on method of operation

WOOD HYDRAULIC HOIST & BODY COMPANY

7936 Riopelle Street — *World's Largest Builder of Hydraulic Hoists and Steel Dump Bodies* — Detroit, Michigan

BUFFALO-SPRINGFIELD ROLLERS

All Types and Sizes
With or without Scarifier attachment.
Helps you finish the job on time.

Send for Catalog A — *for complete information*

The Buffalo-Springfield Roller Co. SPRINGFIELD OHIO

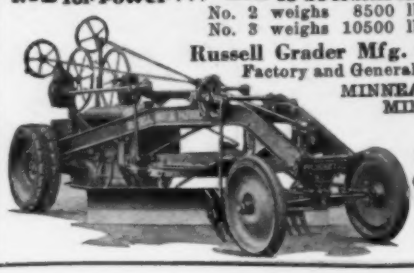
Russell Motor Patrol

Made in Two Sizes

No. 2 Fordson Tractor for Power . . . No. 3 Mc Cormick-Deering 10-20 Tractor for Power

No. 2 weighs 8500 lbs.
No. 3 weighs 10500 lbs.

Russell Grader Mfg. Co.
Factory and General Offices
MINNEAPOLIS MINN.



Write for Catalog Showing Full line

The Breakers

ATLANTIC CITY

Preferred—in Autumn and all seasons—by those who know and want the best... either upon the American or European plan... and sensible rates withal.

Health Baths, Golf privileges, Orchestra, Dancing. Garage on premises. Bathing from Hotel

JOEL HILLMAN, President
JULIAN A. HILLMAN, V.-President

In Ohio

In New Jersey

In Illinois

No. 5 of a series of advertisements:—"Paving America with Vibrolithic." Watch for future issues.

"Armorplated concrete paving built by

THE Vibrolithic METHOD

Write for Booklet A 12

American Vibrolithic Corporation
INSURANCE EXCHANGE BUILDING DES MOINES, IOWA

While the City slumbers, this Austin Motor Sweeper moves quietly down its streets picking up the dirt and refuse from the day before and leaving the streets fresh and clean for the day to follow. A brand new catalog discussing street cleaning problems in general has just been completed.

Write for your copy today.

The Austin-Western Road Machinery Co.

Branches in 22 Cities **400 N. Michigan Ave., Chicago, Ill.**

R&p

Royal Palace

on the Beachfront

ATLANTIC CITY

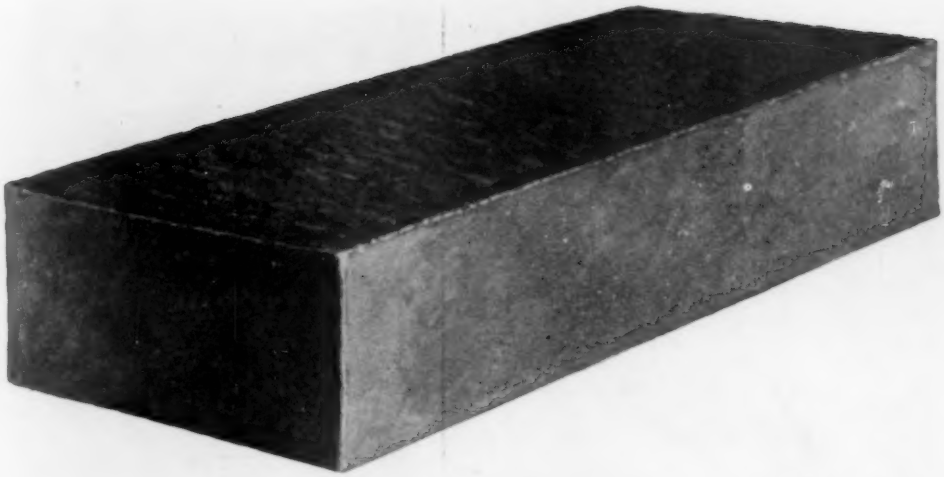
Send for Illustrated Booklet and Schedule of Rates

No "Seasons" at Atlantic City!

NO MATTER what time o' year you come to Atlantic City you are "in season." So, too, with the Royal Palace Hotel. Situated on the Boardwalk and radiating an air of restful hospitality. All rooms have running water—most rooms have private bath—all baths both sea and fresh water. Hotel operates under American Plan and presents a distinguished cuisine. On the premises: Private Sea Water Swimming Pool, Tennis Courts, Dancing, Children's Play Room, Therapeutic Baths, Barber, Beauty Parlor, Roller Chairs—truly—*a Resort in Itself!*

STITZER HOTEL CO.

OWNERSHIP MANAGEMENT



Pavements of two-and-one-half-inch vitrified brick under exhaustive official test surpass all expectations

HEAVY-TRUCK traffic equal in severity to from 18 to 70 years' service on main highways failed to break down pavements laid of 2″ and 2½″ vitrified brick.

The Arlington Test, therefore, means major savings to alert communities.

It means that the first cost of vitrified brick pavements is materially reduced without sacrifice of that endurance which vitrified brick has proved and re-proved in every type of service. Let us send you complete copies of the official figures.

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING CLEVELAND, OHIO

PAVING BRICK Baffles the Tax Bug

VITRIFIED Brick VITRIFIED Brick VITRIFIED Brick

Broadening the Scope of Concrete Achievement

THE FIRST FUNCTION of the admixture Celite in a concrete mixture is to improve its workability.

Without excess mixing water, concrete in which Celite is used flows readily into the forms, creeps around the most complicated network of obstructing conduits or piping, and settles firmly around re-inforcing bars.

A great deal of manipulation and spading is saved. Finishing is rendered an easy matter. The necessity of "patching up" after forms are removed can be entirely eliminated.

Water-tightness of the finished concrete is effected. Uniformity is assured. Honeycombing can be avoided altogether.

In a bigger way this workability admixture is serving users of concrete. It is broadening the scope of concrete construction by overcoming the difficulties presented by intricate forms; by enabling the making of concrete which is water-tight all the way through, and by insuring higher final strength values.

May we send you a complete discourse on the use of admixtures? Write for Bulletin K-314, to Celite Products Company, 11 Broadway, New York; or 53 West Jackson Blvd., Chicago; or 140 Spear Street, San Francisco.

CELITE

Insures Better Concrete at Less Cost

Heil Model 11 Steel Dump Body fitted with swinging partitions and mounted with a No. 5 Heil Hoist on a 3½-ton truck.

HEIL

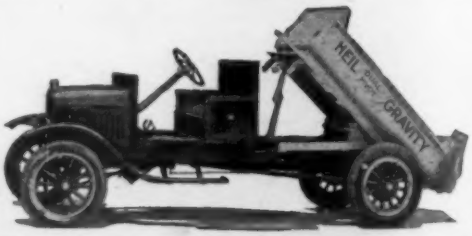
DUMP BODIES and HOISTS

Whether it's hauling hot asphalt, ashes, rubbish, garbage, sand, gravel, or cinders you will always find a Heil Steel Dump Body and Hydro Hoist especially adapted to do the job. Steel Dump Bodies "made by Heil" are built the way you want them. Select the type for your City from our Catalog No. 140 and Bulletin No. 146.

THE HEIL CO.

1242-60 26th Avenue, Milwaukee, Wis.

One of our twenty-five distributors is near you. Factory Branches: **Chicago, Philadelphia, Boston, New York**



This is the new model 105 Heil Dual Pivot Gravity Dump Body for mounting on the Ford and other light weight trucks. It has a capacity of 1 cu. yd., which can be readily increased to 1½ cu. yds. Carried in stock ready for immediate delivery.

CURE CONCRETE *while you mix it!*

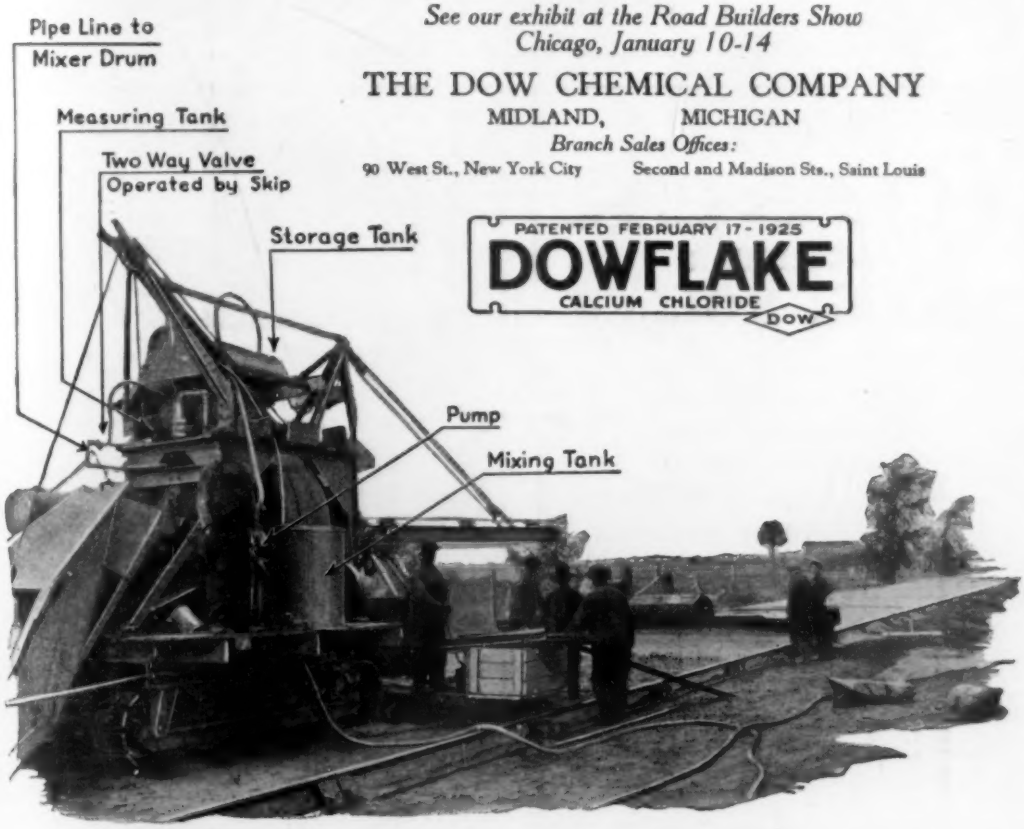
Many road builders who previously used Dowflake as a surface curing agent are now using it added directly to the mix in the form of a solution.

Any standard mixer can be easily equipped to permit admixture curing. The illustration shows an excellent arrangement. The Dowflake is mixed in an open-top mixing tank. From the mixing tank the solution is pumped into a storage tank. This feeds a measuring tank, which is automatically opened by the skip when it comes up. This releases the proper amount of solution which runs into the mixer drum with the cement and aggregates.

This admixture method results not only in greater economy and ease of handling, but also insures more uniform curing because the curing agent penetrates throughout the mix.

See our exhibit at the Road Builders Show
Chicago, January 10-14

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN
Branch Sales Offices:
90 West St., New York City Second and Madison Sts., Saint Louis



The latest improved oil burning kettle

CONNERY'S

STYLE "J"

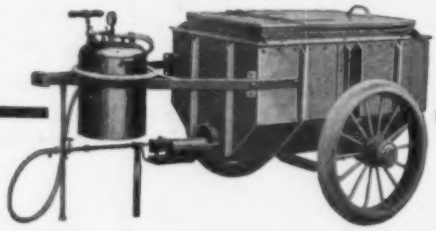
In this kettle the inside tank is so constructed that the hot and cold materials are kept separate. This means that cold material can be added without lowering the temperature of the heated material. It means **low fuel cost** and **absolute temperature** control.

The inside tank is electrically welded and non-leakable. It can be easily removed for cleaning.

Let us tell you more about this latest and best development in oil burning kettles.

CONNERY & COMPANY, INCORPORATED

4000 N. SECOND ST. **PHILADELPHIA, PA.**



THE

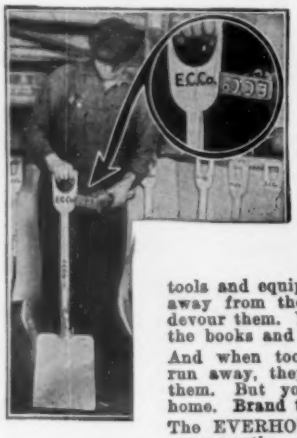
HUBER

4-CYLINDER

MOTOR ROLLER

Vibration-less
Dependable
No Shifting Gears
Roller Bearings
Transmission Gears Enclosed
Running in Oil

THE HUBER MFG. CO.
305 Center St. **Marion, Ohio**



THESE TOOLS ARE NOT

ORPHANS

Tools and equipment, like children and dogs, wander away. Children and dogs come back, but tools and equipment don't. Once away from the fold, the wolves devour them. You write them off the books and buy more.

And when tools and equipment run away, they take Profit with them. But you can keep them home. **Brand them.**

The EVERHOT Branding Torch permanently marks your tools and your equipment.

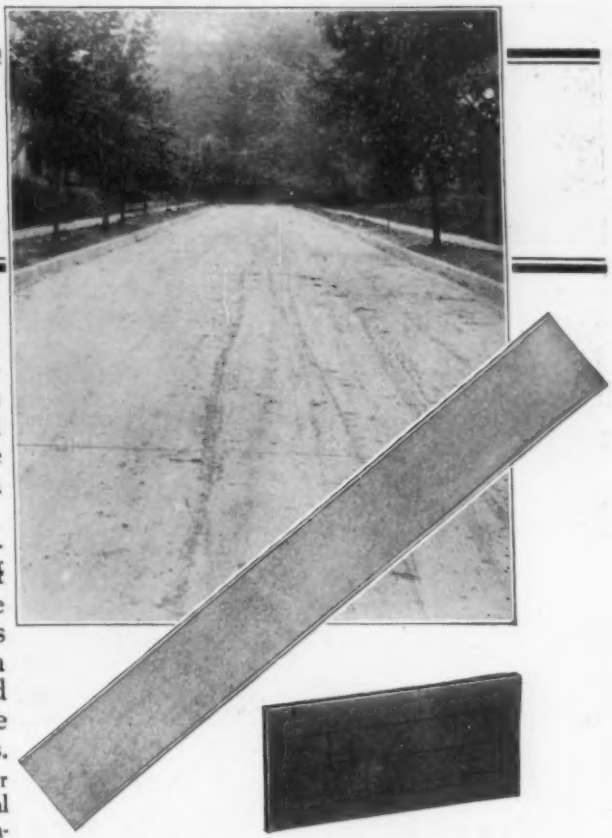
No more orphans of the storm. Tools branded the EVERHOT Way are safe from the hands of pilferers.

Brands or solders continuously. Burns gasoline.

Write for low prices and descriptive circular.

EVERHOT
America's Brand Makers
MANUFACTURING CO. MAYWOOD, ILLINOIS

Servicised Roads are Enduring—



A white ribbon of pavement looks fine just after it is completed. Whether it retains its appearance and utility six months or a year later depends on several factors—not the least being the expansion joints laid between the slabs.

If these have not proper elastic and resilient qualities and if they are incorrectly installed, the deterioration of any pavement is hastened! Foreign particles open crevices between the slabs and seepage undermines the subgrade with resultant cracks and cave-ins.

Conditions like this need never occur if the road builder uses Servicised Metal Edge Expansion Joints. Scientifically manufactured to meet and offset the most severe conditions, Servicised Joints eliminate all possibility of faulty installation and function accurately throughout the natural life of the pavement.

They are easily installed, with sufficient rigidity to eliminate use of backing board and at the same time to insure an accurate, non-wavy line. They have sufficient plasticity and resiliency to meet the contraction and expansion of the slabs but do not ooze out on the pavement and wear away and do not permit the working in of pebbles or other foreign substances. "Servicised" concrete roads are enduring!

See our nearest dealer or write us today for full information on the new Servicised Metal Edge Expansion Joint.

SERVICISED PRODUCTS CORPORATION

Manufacturers of Servicised Type B Expansion Joint, Metal Channel Cap, Red Coat Expansion Joint, Gray Filler, Sewer Pipe Joint, Asbestos Cement, Marking Paint, Metal Edged Expansion Joint, Rubber Oil, Center Strip, Rail Filler and Asphalt Filler.

6051 West 65th Street
CHICAGO, ILLINOIS

Servicised Webbed Joint

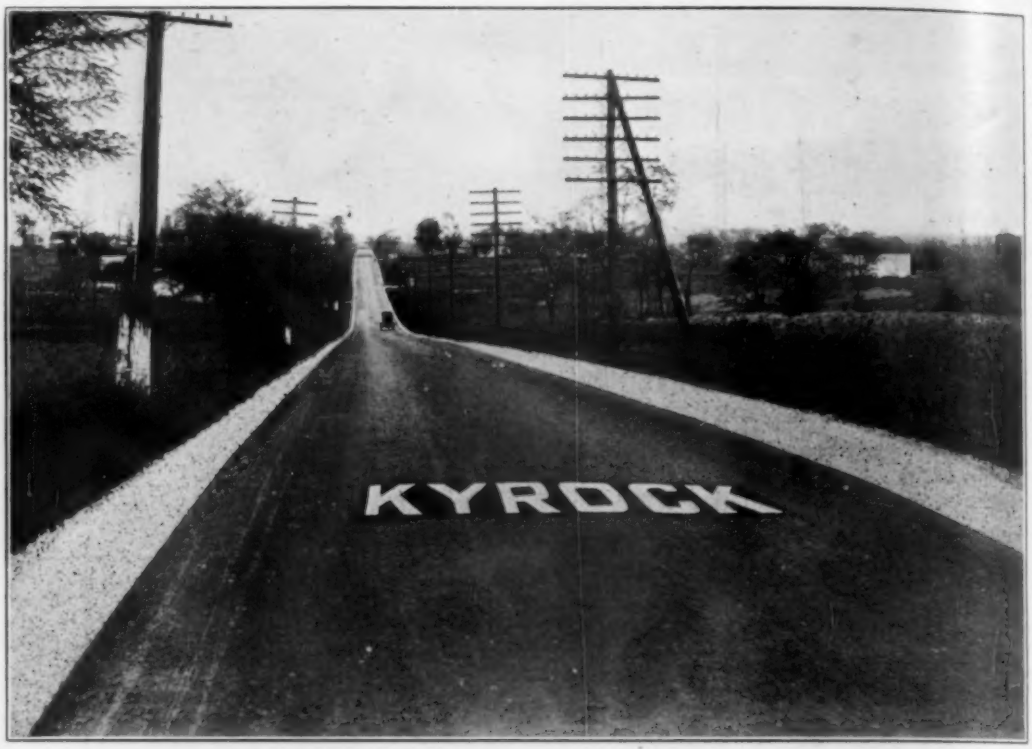
Another important and popular type is the Servicised Webbed Joint, a joint that offers increased rigidity without the loss of proper resiliency and resistance to traffic and wear necessary to the correct functioning of an expansion joint. It is particularly desirable when only ½" or ¼" fillers are installed, in view of the additional rigidity and strength which the webbed sides produce.

Its reaction to the various physical tests normally applied to such materials indicates it to be a superior type of product in every respect, and where only the best is desired you cannot go wrong by specifying Servicised Webbed Joint.

This trademark, found on all Servicised Products, is the symbol of careful workmanship and sincere endeavor. It is a guarantee that Servicised Products are made right, sold right and will function right. Look for the trademark on all our products.

SERVICISED EXPANSION JOINTS

REG. U.S. PAT. OFF. © 1918



Midland Trail through Shelby County, Ky., "Kyrock" on macadam, built 1924. An 18 mile stretch of "Kyrock" surface carrying an exceptional percentage of steel-tired traffic including tractors, mowing and hay tools, in addition to heavy truck and bus service. Not a crack or roll in it today.

100 percent UNIFORMITY

"Kyrock" is laid *cold*. Requires only shovels, rakes and roller and ordinary labor. Ideal for patching old sheet-asphalt, brick, block and concrete. A "Kyrock" wearing surface converts old worn roads into smooth, permanent pavements at small cost. Write today for "The Kyrock Book."

SAMPLE every square yard in every mile of "Kyrock" surface laid and it will test uniform to a fraction of one percent.

The quality and characteristics of the aggregate and asphalt are constant, the volume of asphaltic content is uniform—*guaranteed.*

There are no lean spots to fail of bonding and ravel out, no rich spots to bleed or soften. "Kyrock" will not crack, shove, roll or wave under the extremes of climate and traffic. If the base holds, "Kyrick" stays *put—Investigate "Kyrock".*

KENTUCKY ROCK ASPHALT CO., *Incorporated*, Louisville, Ky.

Kyrock

The Perfect Pavement

KENTUCKY ROCK Kyrock ASPHALT

Bellevue Avenue, the finest street in Newport, R. I. is paved with portland cement concrete.

Fine Streets are Paved with Concrete

Although the big point in favor of paving with portland cement concrete is its moderate cost, wealthy home owners insist upon concrete primarily because of its attractive appearance.

All of the facts are in our free booklet on "Concrete Streets." Ask for your copy.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

Atlanta	Denver	Lincoln, Nebr	Oklahoma City	Salt Lake City
Birmingham	Des Moines	Los Angeles	Parkersburg	San Francisco
Boston	Detroit	Milwaukee	Philadelphia	Seattle
Chicago	Indianapolis	Minneapolis	Pittsburgh	St. Louis
Columbus	Jacksonville	Nashville	Portland, Oreg	Vancouver, B. C.
Dallas	Kansas City	New Orleans	Richmond, Va.	Washington, D. C
		New York		

GALION

E-Z LIFT
LEANING WHEEL GRADER

This new Galion grader is the strongest and easiest operating, Leaning Wheel Grader ever made.

Write for complete information

The Galion Iron Wks. & Mfg. Co.
Galion, Ohio

WIRE FABRIC

"The Steel Backbone for Concrete"

AMERICAN STEEL & WIRE COMPANY'S Wire Fabric is furnished in sheets or rolls for *reinforcing* roads, posts, pipe, culvert, driveways, sidewalks, cellars, floors, porches, etc.

Wire Fabric provides Steel in its strongest form; gives positive mechanical bond and exact spacing of members.

We invite your inquiry for detailed information.

AMERICAN STEEL & WIRE COMPANY

Sales Offices:
CHICAGO NEW YORK BOSTON CLEVELAND WORCESTER DETROIT PHILADELPHIA PITTSBURGH BUFFALO CINCINNATI KANSAS CITY BIRMINGHAM WILKES-BARRE ST. LOUIS ST. PAUL OKLAHOMA CITY BALTIMORE MEMPHIS DALLAS ATLANTA DENVER SALT LAKE CITY

EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK
PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS CO.
SAN FRANCISCO LOS ANGELES PORTLAND SEATTLE

HONHORST TAR HEATERS

"Built for service"

ALL STYLES

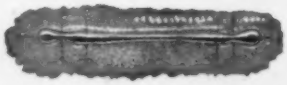
Portable and Stationary
25 to 200 gallons

See our page in Street Construction Section Municipal Index for the Kettle you need

or

Write for Catalog.

THE JOS. HONHORST CO.
1016 W. 6th St. Cincinnati, O.



Bi-Lateral Fire Hose construction keeps the rubber from cracking or leaking. If you want the best fire hose at the lowest cost per year of service, send for our catalogue.

BI-LATERAL FIRE HOSE CO.
230 West Randolph St. Chicago, Ill.

WATSON ASH WAGONS

Newark, N. J., Standardized on Watsons

AN EVERY DAY SCENE IN NUMEROUS CITIES

REX-WATSON CORPORATION - Canastota, N. Y.

A GOOD ROAD

Newport Culverts make good roads better. Usually the culverts under it cause a good road to go bad. Uneven settling of fills, vibrations of heavy traffic and other causes break Monolithic or Masonry Culverts. These breaks gradually open, causing the roadbed directly above to sink. Compare the difference where

SMOOTH ROADS REMAIN SMOOTH WITH NEWPORT CORRUGATED CULVERTS

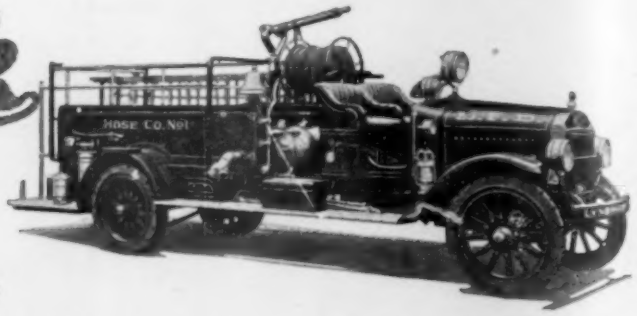
under them. Installations made many years ago show extraordinary service with little or no signs of depreciation. Newport Culverts have proved their superiority under most exacting conditions of service, including economy, resistance to vibrations, enormous pressure and the elements.

NEWPORT CULVERTS ARE EASILY INSTALLED BY UNSKILLED LABOR

THE NEWPORT CULVERT CO
Newport Kentucky

Write for valuable special calvert handbook A. No obligation.

Mack delivers its fourth unit to *Lynbrook, L. I.*



SIX years ago the citizens of Lynbrook purchased a Mack 300 gallon pumping engine. In 1923 they added two more pieces—a 500 gallon pumper and a city service hook and ladder truck.

Now the citizens of Lynbrook have made a fourth protection investment—a Mack AB combination chemical and hose car with extra large hose body and deck pipe.

The full line of Mack Fire Apparatus includes motors of either 4 or 6 cylinders and pumping engines with capacities ranging from 300 gallons to 1000 gallons per minute. In other words Mack equipment meets the needs of small communities as well as the largest metropolitan fire departments. Send for complete information.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway - New York City

One hundred and six direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," or "MACK TRUCKS OF CANADA, LTD."

796 FEET ABOVE BROADWAY

AN AHRENS-FOX RECORD

Inside the Fire Lines—Ahrens-Fox Piston Pumpers are known as the Hard Hitting Pinch Hitters.

ASK THOSE WHO KNOW

The Ahrens-Fox Fire Engine Co.
Cincinnati, Ohio

BRAXMAR BADGES

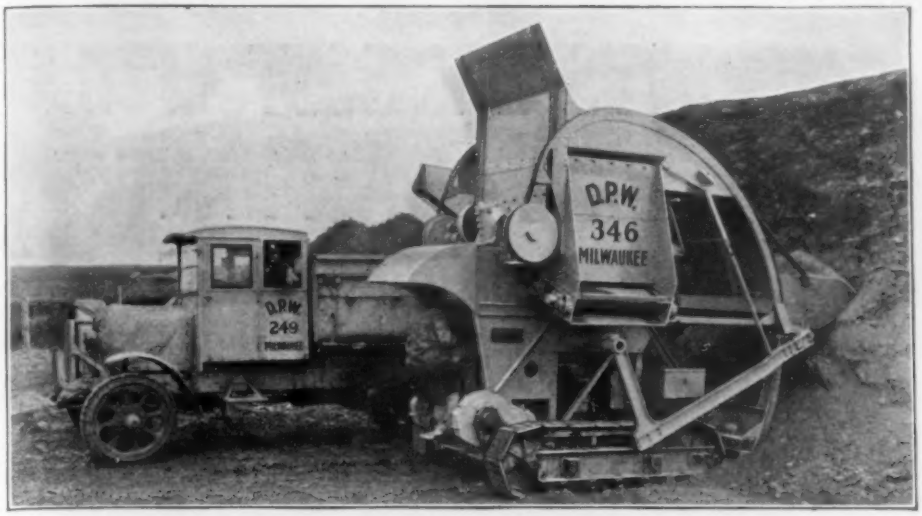
Police, Fire and Municipal Badges in all Metals—Fully Illustrated Catalog.

C. G. BRAXMAR CO., Inc.
242 West 55th St. New York

CHAUSSE

Oil Burning Tool and Surface Heaters
Kerosene Torches
Portable Asphalt Plant

CHAUSSE OIL BURNER CO.
1227 W. Beardsley Ave., Elkhart, Ind.



The New Type "W" Loading Ashes for the City of Milwaukee

THE MANIERRE

FORDSON POWER **WAGON LOADER** FORD PARTS

TYPE "W"

The Manierre Loader requires only one operator and will handle 1½ tons per minute, or three yards of snow at a cost of 2½c per yard including interest, depreciation, repairs and operating expense.

It is an All-Year-Round machine for handling snow, dirt, ashes, etc., without expensive alterations or attachments. It is quickly and easily operated in cramped surroundings, such as narrow streets with car lines or elevated structures, etc.

Write today, for further information

MANIERRE
ENGINEERING & MACHINERY CO.
MILWAUKEE, WIS.

AMERICA'S LARGEST CITIES PAVE WITH ASPHALT

The twelve largest cities in the United States, namely, New York, Chicago, Philadelphia, Detroit, Cleveland, St. Louis, Boston, Pittsburgh, Baltimore, Los Angeles, San Francisco and Buffalo, laid pavements during the six years, 1920 to 1926, averaging for the twelve cities as follows: *ASPHALTIC TYPES* 73.9%; portland cement concrete 13%; stone block 8%; brick 5%.

It would profit *ANY* city, when laying out a paving program, to consider the engineering judgment of America's twelve great cities with a combined population of 16,369,291, in having for their new paving three times as much asphalt yardage as *all other types of pavement combined*.

Asphalt has not only been "proved through the ages", but is going stronger today than ever before. It is the dustless, noiseless, deathless material which endures through heat and cold, drought and flood, wear and tear.

Write for specifications and complete information.

THE ASPHALT ASSOCIATION

441 Lexington Avenue, New York, N. Y.

Albany, N. Y.	New Orleans, La.	Chicago, Ill.
Charlotte, N. C.	Kansas City, Mo.	Toronto, Can.

AMERICAN LAFRANCE

PUMPERS Work 100 Continuous Hours

To bring relief to Florida Storm Victims

At every great disaster where fire departments have been called upon for relief, American-La France Fire Apparatus has distinguished itself.

The Florida storm was no exception. At Hollywood-by-the-Sea, Florida, the storm having cut off the water supply, three American-La France Pumpers worked for 100 continuous hours furnishing water for four hotels filled with injured people.

This is equivalent to driving these cars at top speed for 100 hours without stopping. When the job was finished, the pumpers returned to their engine house in perfect condition for their regular duty.

This kind of reliability has put American-LaFrance Fire Apparatus in 90% of America's fire departments.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

ELMIRA, N. Y.

BRANCHES

NEW YORK
PHILADELPHIA
PITTSBURGH
CHICAGO

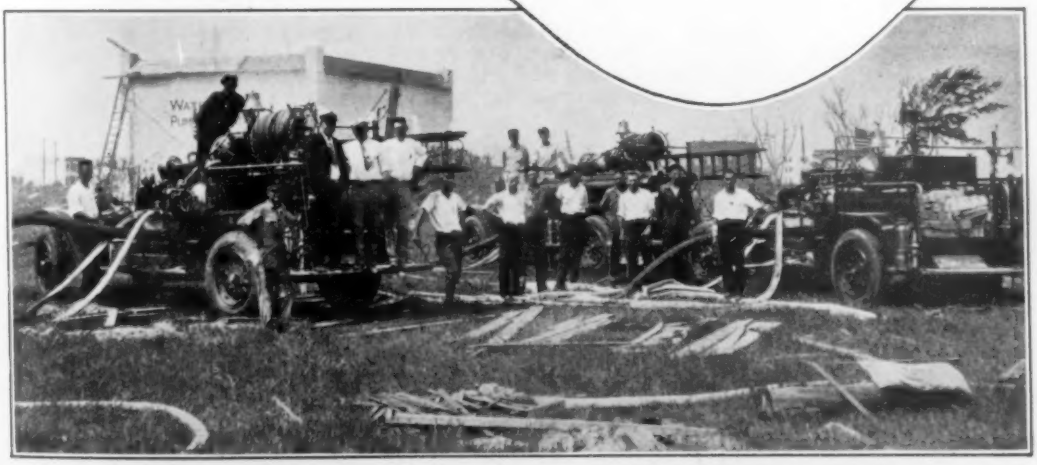
ATLANTA
BALTIMORE
BOSTON
MONTREAL

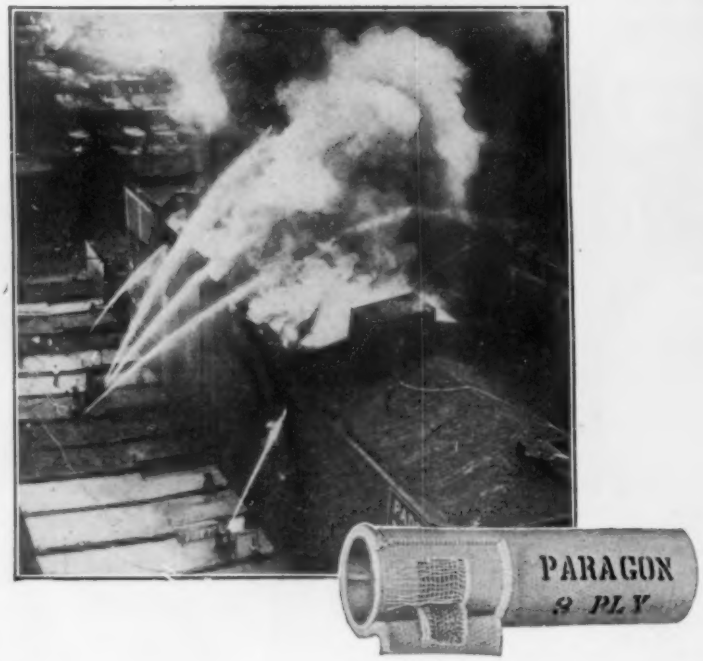
BRANCHES

DALLAS
DENVER
SAN FRANCISCO
PORTLAND

LOS ANGELES
KANSAS CITY, MO.
MINNEAPOLIS
VANCOUVER

CANADIAN FACTORY TORONTO ONT





Make Your Fire Hose a Real Investment

When you buy Fire Hose you make an investment—an investment in efficient, dependable fire protection. Why continue to buy hose on a compromise basis when often if but ten cents a foot were added to the purchase price you could buy the finest hose on the market—hose that will outlast the cheaper hose at least two or three times!

Stop jeopardizing the dependability of your hose equipment by short-sighted purchasing. For over fifty years Paragon and other famous brands of Eureka manufacture have been the recognized standards of fire hose quality and service.

Eureka Fire Hose Manufacturing Co.

50 Church Street — New York City

BRANCHES

Atlanta	Dallas	Kansas City	Philadelphia
Boston	Denver	Los Angeles	Portland
Chicago	Detroit	Minneapolis	Syracuse
Columbus			

TRADE MARK

Year around law enforcement

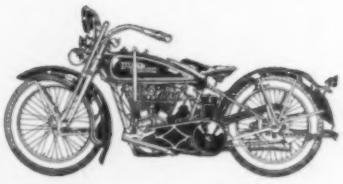
IN Milwaukee, where winter is Winter, the entire motorcycle squad is as actively on the job every day in December, January and February as in midsummer

The officers are properly clothed for severe weather and their Harley-Davidson machines are equipped with windshields and legshields. Laws are enforced as vigilantly in winter as in summer.

The world-famed dependability of Harley-Davidson makes them doubly preferable for cold *weather work*. Over 2400 departments —state, county and municipal—are *adding* to their Harley-Davidson equipment.

Send for special police literature.

HARLEY-DAVIDSON MOTOR COMPANY
DEPARTMENT M MILWAUKEE, WIS.



The 1927 Twin is the greatest Harley-Davidson of all. Many improvements but no radical departures from time-tried design. Prices are lower! See your Harley-Davidson dealer or write us direct.

Harley-Davidson
The Motorcycle

"Midland's Greatest Son"

Send for your copy today

YOU will be intensely interested in this booklet. It contains a specific message every citizen—especially every city official should read. We have a limited supply of these booklets. If you will send us your name and address, we will be glad to send you a copy.

Forty years of building Powerful High Grade Fire Apparatus. 6,000 Boyer sealed Cartridge Chemical Tanks in operation and never a failure.

BOYER FIRE APPARATUS CO.
LOGANSPORT INDIANA

UNIFORMS

QUALITY M-L UNIFORMS CO. MAKERS CHICAGO

POLICE, FIRE AND TRAFFIC UNIFORMS A SPECIALTY

Clothing Headquarters FOR Highest Quality and Finest Tailoring

Wear uniforms that excel in value. You cannot buy cheap made apparel here—yet our prices are so reasonable that every prospect can wear M-L Quality Built Uniforms.

Write for descriptive catalog and samples —Address Dept. O.

MAIER-LAVATY COMPANY

Quality Built Uniforms

2143-45 Lincoln Ave. Chicago

FABRIC FIRE HOSE COMPANY

127 DUANE STREET

NEW YORK, N. Y.

***FACTORY:* SANDY HOOK, CONN.**

Patentees and Sole Manufacturers since 1880

WAX AND PARA GUM TREATED COTTON RUBBER LINED FIRE HOSE

BRANCH OFFICES:

Chicago, Ill.
Atlanta, Ga.
Columbus, Ohio
Minneapolis, Minn.
Dallas, Texas
Portland, Ore.
San Francisco, Cal.
Baltimore, Md.
Boston, Mass.
Binghamton, N. Y.
Pittsburgh, Pa.
Bloomfield, N. J.
Montreal, Canada

Why 730 Fire Departments

insist on genuine Firefoam

for controlling and extinguishing "extra-hazardous" fires

EXPERIMENTS have no place in municipal protection. Professional fire-fighters accept a new extinguishing method only after the most exhaustive demonstrations.

It took many years to perfect the *Foamite* method—and many years of success in actual service to convince fire chiefs.

Today, 730 Departments use *Foamite* equipment because the genuine Firefoam it generates will control and kill fires that other methods cannot control.

FIREFOAM quickly smothers out fiercely blazing oil, gasoline, paint, grease, etc.—as well as ordinary combustibles. Moreover, this upstanding, heat-resisting foam "insulates" burning material and allows a nearer approach to the base of the fire. And it does practically no damage to property.

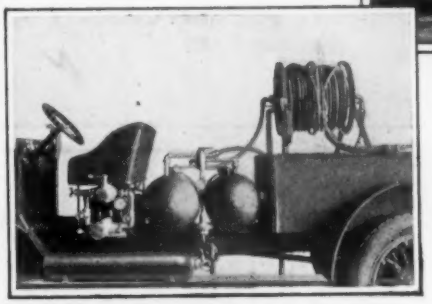
Success invites imitation—but time alone will show whether the established efficiency of the *Foamite* method can be improved upon.

A generation of designing and building fire-fighting equipment, from hand extinguishers to complete motor apparatus, enables Foamite-Childs to offer genuine *Foamite* Protection in forms suitable for any municipal need and within reach of any municipal budget.

Write for specifications and prices of *Foamite* 2½-gal. Splash-Proof Hand Extinguishers and *Foamite* Tank Equipment for motor apparatus.

FOAMITE-CHILDS CORPORATION
Fire Protection Engineers and Manufacturers
77 Turner Street, Utica, N. Y.
Sales and Engineering Representatives in all leading cities

Above: laboratory illustration showing how two chemical solutions in genuine Foamite equipment combine to form Firefoam, which floats on liquids, clings to any burning surface, smothers fire and insulates against reflash. At right—the Foamite 2½-gal. Splash-Proof Extinguisher, which generates 20 gallons of Firefoam



Foamite *40-gallon tanks, single or double, can be mounted on any chemical apparatus, replacing the familiar but less effective soda-acid tanks*

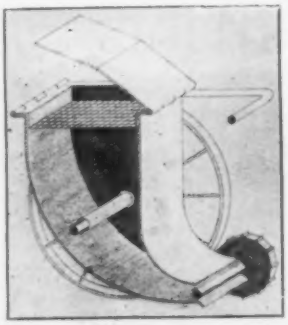
Millions of tough bubbles, forming an air-tight blanket of Firefoam that resists fierce heat, holds fast despite strong drafts, and kills fire without the soaking damage to property done by water or liquid chemicals. The formula for generating this foam is exclusive with Foamite-Childs

Genuine

Foamite-Childs Protection

A Complete Engineering Service

Against Fire



The
TARCO
SIDEWALK SANDER

Information upon request

TARRANT MANUFACTURING CO.
SARATOGA SPRINGS, N. Y.

Do away with those dangerous slippery walks.
Use the "Tarco" Sidewalk Sander.
You'll find it effective, light and easily handled, yet durable—a great labor-saving device.
It will place on the sidewalk with one filling a spread of sand 20 inches wide and approximately 2,000 feet long—as quickly as a man can walk.

NOTICE!!!

Sealed bids and proposals will be received by the Common Council of The City of South Amboy, N. J., on Tuesday Evening, November 30th, 1926, at 8 o'clock, P. M. in the Council Chamber at City Hall; for the installation of an electrically operated traffic control system. Each bid must be accompanied by a certified check in the amount of 2 per centum of the bid submitted. Plans and specifications may be obtained at the office of the City Clerk at City Hall, South Amboy, N. J. The Council reserves the right to reject any or all bids as may best serve the interests of the city.

By order of the Common Council:

G. FRANK DISBROW,
City Clerk.

Selling Bonds Is Borrowing Money

The best terms can be obtained by making the security most attractive to the investor. We deal exclusively in municipal bonds and are equipped to serve States, Cities, Counties and School Districts in the issuance and sale of bonds.

C. W. McNEAR AND COMPANY
Established 1908

First National Bank Building
Chicago

Equitable Building
New York

Write for Catalogs

MUNICIPAL BADGES
LICENSE PLATES

The
C. H. HANSON COMPANY
178 No. Clark St.
CHICAGO, ILL.

POSITION WANTED

Electric light plant superintendent leaving present position Dec. 1. Thoroughly experienced on inside and outside operation, also on steam and Fairbanks-Morse Diesels.

H. A. CARVER

Woodsfield **Ohio**

A railing of strength and distinction

Remarkably strong—because each picket is electrically-welded to the rails at sixteen points.

Distinctive—because of simple, clean-cut lines, unmarred by braces, lugs or rivets.

For full information regarding this Anchor Railing and its features of construction, write for our new Catalog No. 62.

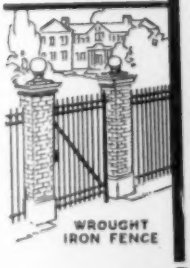
Anchor Post Iron Works
9 E. 38th St., New York, N. Y.

Branch Offices and Sales Agents in Principal Cities.

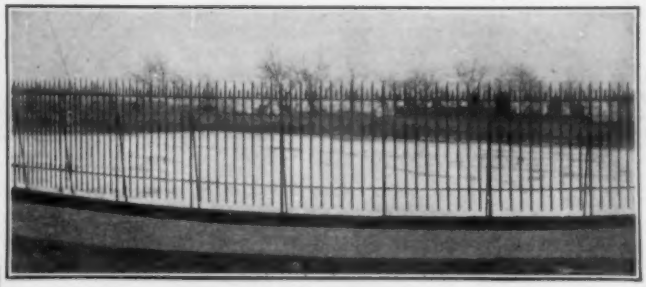
2605

ANCHOR *Fences*

FENCES & GATES



Afco FENCES
PRODUCT PLUS SERVICE



Stewarts FENCES
STANDARD OF THE WORLD

Wrought Iron and Chain Link Fence

Each has its place! For substantial dignity, Wrought Iron Fence has no equal. "The World's Largest Builders of Iron Fence" offer a most excellent product in a range of designs for every purpose.

Chain Link Wire Fence can be built with a smaller appropriation, is equally effective in the protection it affords, and is always a good looking enclosure.

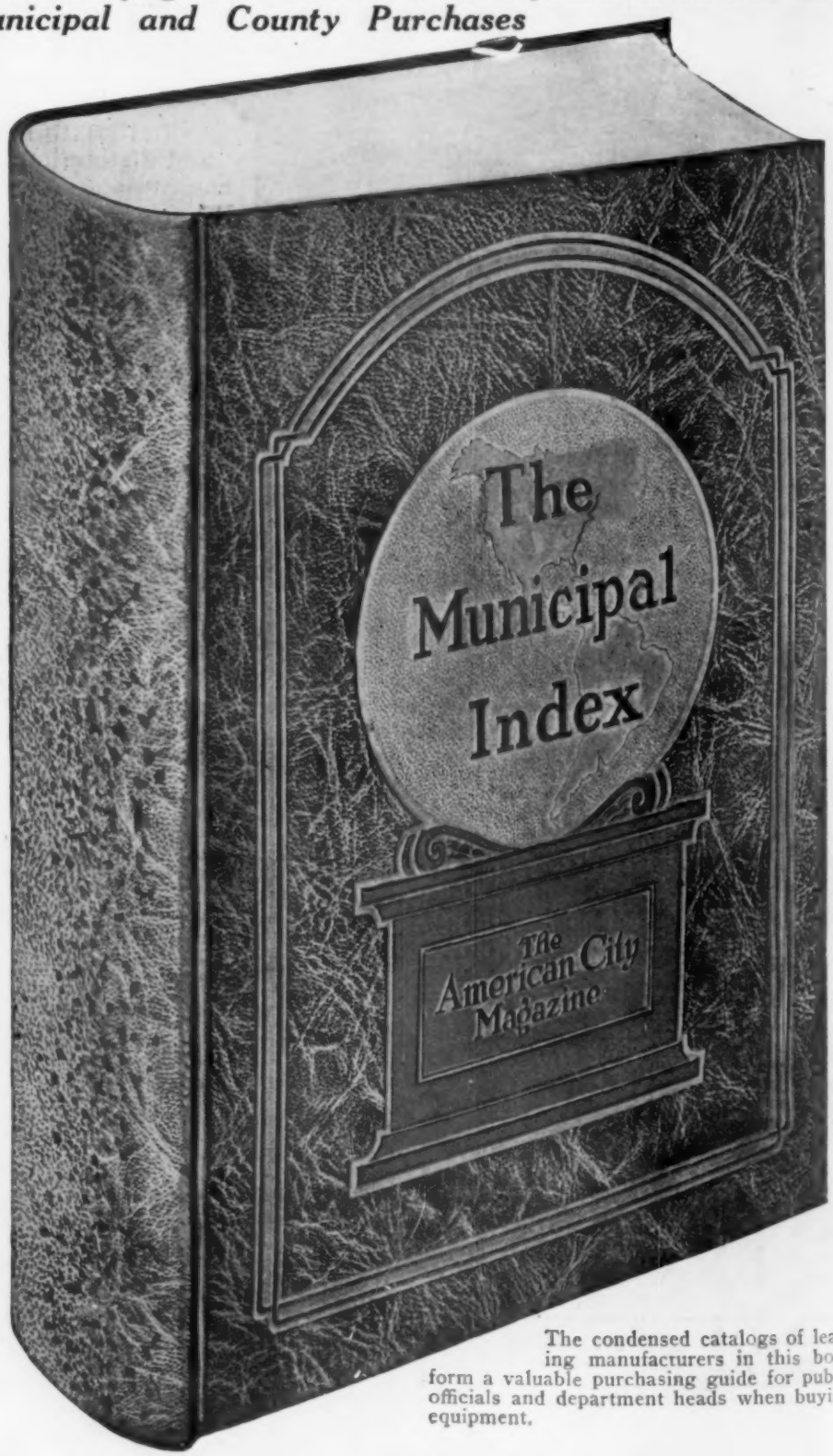
Catalogs on either type will be sent on request.

THE STEWART IRON WORKS CO., INC.
216 Stewart Block
Cincinnati, Ohio

AMERICAN FENCE & CONSTRUCTION CO.
Excelsior Saving Bank Bldg.
New York, N. Y.

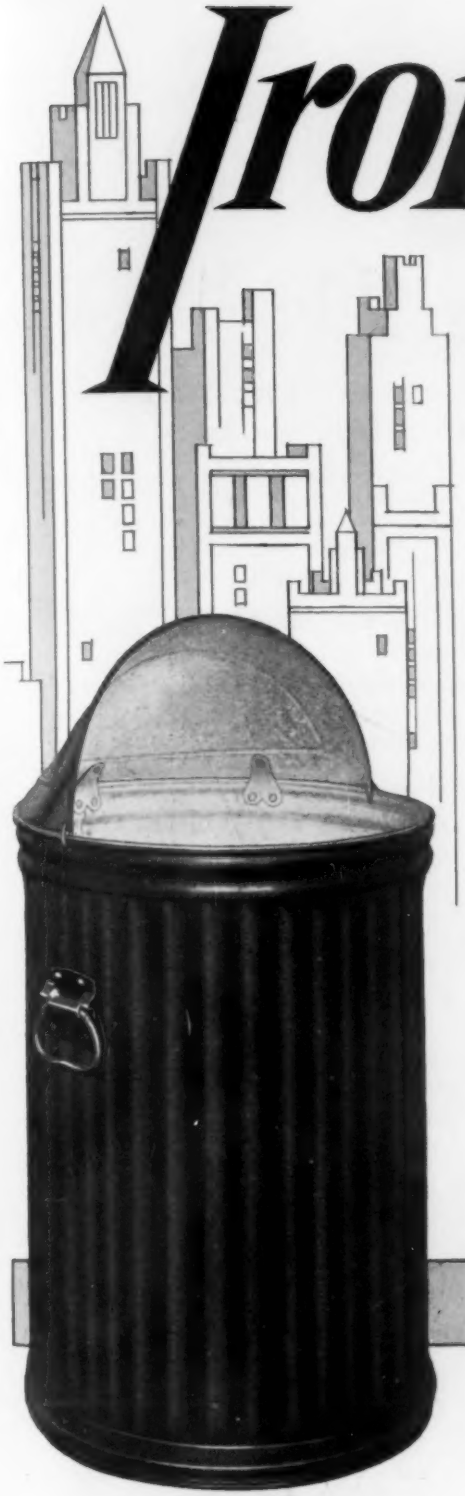
FOR ALL PURPOSES

This 600 page volume has a widespread influence on Municipal and County Purchases



The condensed catalogs of leading manufacturers in this book form a valuable purchasing guide for public officials and department heads when buying equipment.

Iron Horse
MUNICIPAL METALWARE



MIGHTY buildings impress, but without clean streets all this beauty and impressiveness is lost.

IRON HORSE METALWARE and street cleaning equipment for cities, help to carry out that policy of cleanliness and sanitation aspired to by all communities.

We have recently added to our already large family of municipal metalware, this new IRON HORSE corrugated rubbish can (hooded type.) You will note the sturdy construction, the heavy vertical corrugations and the strongly shaped iron band on the bottom together with the same pleasing simplicity found in all IRON HORSE products. Made from heavy galvanized sheets and equipped with convenient drop handles, this can, with it's unusual strength and durability will stand up under the most severe handling. Make your *street line* as impressive as *your skyline*,—the IRON HORSE way.

Catalog on Request

ROCHESTER CAN COMPANY
107 Hague Street Rochester, N. Y.

Keeps drives and paths Weed-Free

INCLUDE ATLAS NON-POISONOUS WEED KILLER IN THE 1927 BUDGET

All forms of objectionable vegeta tion are easily and permanently controlled at minimum cost and effort with inexpensive atomizing apparatus. Small tanks with atomizers have replaced the cumbersome water tanks.

ATLAS NON-POISONOUS WEED KILLER will safely kill any undesirable plant life without poison hazard to humans, animals or birds. Road surfaces are preserved without disturbance at a cost far below hand weeding. Atlas NON-POISONOUS WEED KILLER also aids chemically in laying dust.

Booklet "E", telling complete story, mailed on request.

CHIPMAN CHEMICAL ENGINEERING CO., Inc. BOUND BROOK NEW JERSEY

Factories: Bound Brook, N. J.—Houston, Tex.—Palo Alto, Cal.—Clearing, Ill.

KILL WEEDS THE SAFE and EASY WAY

A NATION PLAN

By CYRUS KEHR

A Basis for Coördinated Physical Development of the United States of America. With a Suggestion for a World Plan.

With a foreword by Frederic A. Delano, of Washington, and by Raymond Unwin, of London.

$5.00

The aim of this book is to point the way to the carrying on of public or civic work starting with the larger area and planning progressively downward to smaller and smaller features or factors.

"You have presented a big idea in a convincing manner and the book may easily prove to be one of the epoch-making contributions to the development and civic progress of America."
—HAROLD S. BUTTENHEIM, *Editor, The American City.*

OXFORD UNIVERSITY PRESS

AMERICAN BRANCH

35 West Thirty-Second Street, New York City

For Mowing Parks and Golf Courses

A great many Park Superintendents favor Ideal Bull Dog gang mowers for the care of large park areas and golf fairways. Simple design, fewer parts, sturdy construction, easy operation, fast work and low upkeep cost explain their preference.

Besides these large mowers, Ideal offers a complete line of power mowing equipment, hand mowers, putting green mowers, golf carts and other golf and park accessories.

Write for our large catalog of the complete line of Ideal equipment.

IDEAL POWER LAWN MOWER CO.

400 Kalamazoo St. Lansing, Mich.
11 E. Harrison St. 237 Lafayette St.
Chicago, Ill. New York, N. Y.

IDEAL

GRASS CUTTING EQUIPMENT

For cleanliness and safety . .

THESE are everyday needs in every community. Canco Trash Cans and Rubbish Burners help meet them—help doubly. For they not only do the work they are built for, but they last so long that they do it economically.

Canco Galvanized Ware remains on the job after years of hard service. First cost should always be divided by length of life to determine the real cost of any such equipment.

The reasons for the long life and low final cost of Canco Galvanized Ware are built-in. For particulars, write to

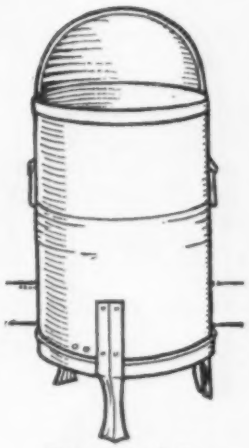
Canco Rubbish Burner

Stands heat without warping or loosening. Made of heavy gauge expanded metal; welded, not riveted. Heavily galvanized after fabrication. Two sizes—sold with or without pan for ashes.

Galvanized Ware Department

American Can Company

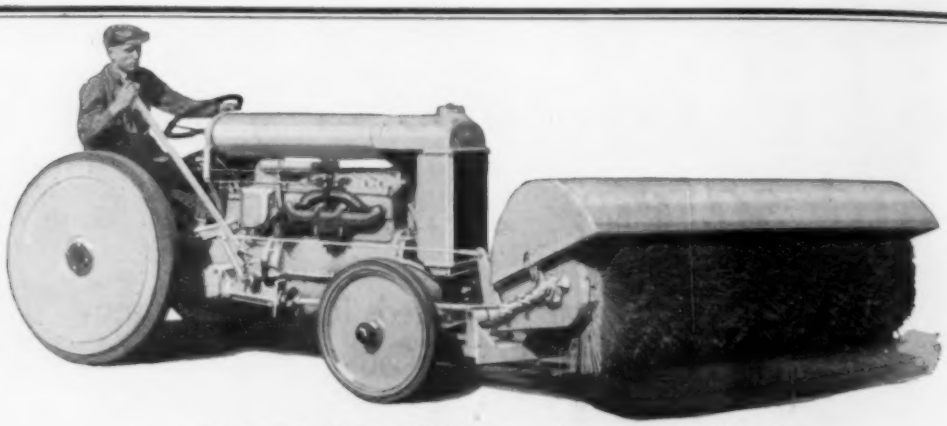
TOLEDO, OHIO



Canco Trash Can

Made of extra heavy sheet steel, galvanized after being made up. Half hood prevents trash blowing out. With or without legs—painted and stencilled as desired. Special sizes made to specifications.

TRADE CANCO MARK



SWEEPS DIRT AND SNOW

The Detroit Street Sweeper and Snow Brush has a sweeping surface approximately 5½ feet wide. It will sweep dirt, refuse, sawdust, shavings, metal borings or any other light material. It will handle snow 10 to 12 inches deep.

Over six hundred in service

Detroit Street Sweeper and Snow Brush - - - - - - - $345.00
F.O.B. Detroit

Whitehead & Kales Co
Detroit Mich

Be Sure Your Drinking Water is Right

Why take a chance on the health of your community?

P. T. L. Systematic Examination is your best insurance against contamination in your Water Supply.

Bulletin 25 tells how we can serve you.

Pittsburgh Testing Laboratory

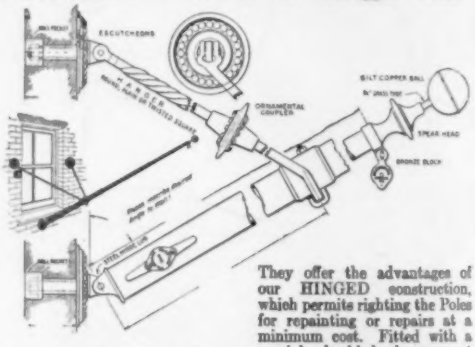
Inspection Engineers and Chemists

Pittsburgh, Pa.

Branch Offices in the Principal Cities.

STEEL TUBULAR FLAG POLES

Our Steel Poles of Tubular Construction have been largely adopted as "Window" or "Outrigger" Poles



They offer the advantages of our HINGED construction, which permits righting the Poles for repainting or repairs at a minimum cost. Fitted with a special shackled, heavy cast Bronze Block (the usual truck is impracticable).

These Poles Are Galvanised all over after fabrication.

Write for our Folder A. I. A. 14f with illustrated Price List and **Typical Installation Plates**

THE POLE AND TUBE WORKS INC.
AVENUE D AND MURRAY ST.
NEWARK, N. J.

Better Steel Poles Only

WATER DISTRIBUTION SPECIALISTS

Little Talks on Water-Works Economy

No. 1

Have you ever stopped to realize that loss of revenue from water waste is a more or less serious problem of practically **every** water department?

If the waste is small, one thing is certain:—it will grow larger, if not checked.

If it is large, it means a gross annual loss of revenue that is staggering to contemplate! Furthermore, it means acquiring an additional source of supply in an unnecessarily short time.

The causes of the waste are not often readily discoverable by ordinary methods. **A specialist is needed.**

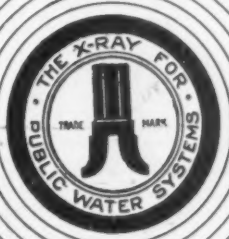
The Pitometer Company engineers are specialists in Water Waste Surveys. These trained experts not only locate and eliminate all manner of leaks, but they give constructive advice and suggestions for getting the most out of every dollar expended in water-works plant and upkeep.

Let us send you our bulletins.
No charge or obligation.

The PITOMETER COMPANY

Water Distribution Engineers

52 CHURCH ST., NEW YORK CITY



NURSERIES

SPECIALIZING IN TREES, SHRUBS & PLANTS FOR PARKS, CEMETERIES, PUBLIC GROUNDS, STREET PLANTING, ETC.

ANDORRA

Ornamentals exclusively, distinctive in quality and variety, for street, park and all civic planting

We cater to the most discriminating trade.

Andorra Nurseries, Inc
Chestnut Hill, Pa

Have you seen ANDORRA?

SHADE TREES *for* CITY PLANTING

For Permanence,—we suggest Red or Pin Oak. Our stock of these varieties is excellent.

We grow Ornamental Trees and Shrubs. 225 acres. Secure our Wholesale Catalogue.

THOMAS B. MEEHAN CO.
Wholesale Nurserymen
DRESHER, PA.

TREES and SHRUBS for CITY PLANTING

We grow them and ship direct. Many cities are planting trees for shade and to make a "City Beautiful"—is yours?

Write us for catalog.

FOREST NURSERY CO. Inc.
McMinnville Tennessee
Forest and Shade Trees and Ornamental Shrubs.

Ornamental Trees, Shrubs, and Hardy Perennials

A complete stock.
Quality unexcelled.
Send for price list.

HENRY KOHANKIE & SON
Painesville, Ohio

NURSERY STOCK

Ornamental Trees, for Street and Lawn. Shrubs, Roses, Evergreens, and Perennials.
Special prices on large quantities.
Send for Catalog and Price List
W. & T. SMITH COMPANY **Geneva, N. Y.**

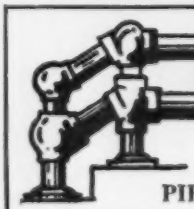
BOBBINK & ATKINS

Ask for Catalog

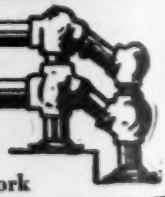
ROSES
EVERGREENS
RHODODENDRONS
TREES AND SHRUBS
OLD-FASHIONED FLOWERS
FRUIT TREES AND BUSHES

Visit Nursery

RUTHERFORD **NEW JERSEY**



IRON PIPE RAILINGS



When in the market for Pipe Railing for Stairs, Bridges or Retaining Walls, send us your drawings. We can quote you prices that will be worth considering. Dept. A

PIPE RAILING CONSTRUCTION CO., Long Island City, New York

Framingham Nurseries

Ornamental trees, shrubs and evergreens for street and park planting.

FRAMINGHAM MASS.

TREES SHRUBS EVERGREENS

400 acres of hardy ornamentals, the largest assortment in Michigan.

We will be pleased to mail you our new "Planting Guide." Special prices to park and cemetery superintendents and other buyers for civic plantings.

PONTIAC NURSERIES
204 Architects Bldg.
DETROIT -:- MICHIGAN

ORNAMENTAL TREES, SHRUBS

ROSES, EVERGREENS, Etc.
Lowest Prices Available
CAR LOTS OUR SPECIALTY
Pleased to Quote
Choice Grass Seeds of Absolute Purity
FREE PRACTICAL PLANS
Designed without obligation for Parks and Cemetery.
We Pay all Transportation Charges
Send for Illustrated Catalogue

J. Otto & Son Nursery Co.
Dept. A.C. 142 Nichols Street, Rochester, N. Y.

GENERAL NURSERY STOCK

Trees, Shrubs, Roses, Hardy Perennials, etc. Catalogs Free. Packing and shipping facilities unexcelled. Pleased to quote you.

Nurserymen for 72 years

THE STORRS & HARRISON CO.
Box "K" Painesville, O.

GODWIN STEEL PAVING GUARDS

PROTECT THE EDGES OF STREET, ROAD, CURB & STREET RAILWAY PAVING. . . .

Write for Illustrated Catalog No. 23.

Various Sizes and Shapes adaptable to all types & character of paving.

W. S. GODWIN CO., Inc.
Race & McComas St., Baltimore, Md.

A Lithoprint

LOOKS LIKE A LITHOGRAPH
COSTS LIKE A BLUE PRINT

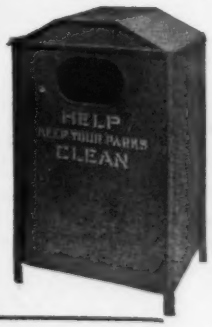
LITHOPRINTS are ink reproductions on any material of

TRACINGS - MAPS - PLANS

Bulletins of special interest to Architects, Engineers & Manufacturers sent on request

LITHOPRINT COMPANY *of* NEW YORK, Inc.
41-43 Warren Street, New York, N. Y.

BUTLER IMPROVED STREET CANS



are sanitary, artistic and serviceable. The refuse thrown into the Butler trash can is out of sight. Once in, it stays in until taken out.

Write for latest literature.

The Butler Mfg. Co.
St. Anthony Fall Sta.,
Minneapolis, Minn.

DIRECTORY of CONSULTING ENGINEERS, LANDSCAPE ARCHITECTS ETC

EXPERT ADVICE IS A REAL ECONOMY

The consultants whose cards appear on the following pages are listed below by States.

B. Rowland Bibbins, Washington, D. C.
Jack, McKenney & Stewart, Washington, D. C.
Lynch Bros., New Haven, Conn.
George Burnap, Washington, D. C.
Alvord, Burdick & Howson, Chicago, Ill.
American Park Builders, Chicago, Ill.
Chicago Landscape Co., Chicago, Ill.
Chicago Paving Laboratory, Chicago, Ill.
Louis S. Cole, Chicago, Ill.
Condron & Post, Chicago, Ill.
Jacob L. Crane, Jr., Chicago, Ill.
Flood & Co., W. H., Chicago, Ill.
Ives & Stern, Chicago, Ill.
Kelker Deleuw & Co., Chicago, Ill.
Maury & Gordon, Chicago, Ill.
Pearse, Greeley & Hansen, Chicago, Ill.
Randolph-Perkins Co., Chicago, Ill.
Edgar A. Rossiter Company, Chicago, Ill.
Shepherd, C. H., Chicago, Ill.
Van Trump Test Lab., Chicago, Ill.
West Suburban Engineering Co., Hinsdale, Ill.
Charles Broesman, Indianapolis, Ind.
S. A. Sulentic Consult. Engr. Co., Topeka, Kan.
Fay, Spofford & Thorndike, Boston, Mass.
Metcalf & Eddy, Boston, Mass.
Weston & Sampson, Boston, Mass.
Arthur H. Blanchard, Ann Arbor, Mich.
J. French Paddock & Associates, Detroit, Mich.
Gerald J. Wagner & Co., Grand Rapids, Mich.
Delos F. Wilcox, Grand Rapids, Mich.
Pillsbury Engineering Co., Minneapolis, Minn.
E. T. Archer & Company, Kansas City, Mo.
Benham Engineering Co., Kansas City, Mo.
Black & Veatch, Kansas City, Mo.
Burns & McDonnell, Eng. Co., Kan. City, Mo.
Haskins & Crawford, Kansas City, Mo.
Mullergren, Arthur L. Kansas City, Mo.
Hudson Co., Wm. D., St. Louis, Mo.
C. E. Smith & Co., St. Louis, Mo.
Conard & Busby, Burlington, N. J.
John A. Foulks, Newark, N. J.
F. A. Dunham, Plainfield, N. J.
American Public Utilities Bur., New York, N. Y.
Banks & Craig, New York, N. Y.
The Beeler Organization, New York, N. Y.
Thomas F. Bowe, New York, N. Y.
City Wastes Disposal Co., New York, N. Y.
H. B. Cleveland, New York
Fairchild Aerial Surveys, Inc., N. Y. C.
Fuller & McClintock, New York, N. Y.
A. E. Hansen, New York, N. Y.
James C. Harding, New York, N. Y.
Hazen & Whipple, New York, N. Y.
Higgins, J. Wells New York, N. Y.
Hill, Nicholas S., New York, N. Y.
Leavitt & Sons, Chas. W., New York, N. Y.
Mann & MacNeille, New York, N. Y.
Rudolph P. Miller, New York, N. Y.
George A. Johnson, New York, N. Y.
Perine & Co. New York, N. Y.
Clarence D. Pollock, New York, N. Y.
Alexander Potter, New York, N. Y.
Clyde Potts, New York, N. Y.
James F. Sanborn & C. L. Bogert, N. Y. C.
Henry W. Taylor, New York, N. Y.
Technical Advisory Corp., N. Y. C.
Universal Audit Company, New York, N Y
Thomas H. Wiggin, New York, N. Y.
Barker & Wheeler Albany, N. Y
Cyril E. Marshall, Hempstead, N. Y.
Walter Jackson, Mt. Vernon, N. Y.
Hopkins, Chas. C., Rochester, N. Y.
Sibley, Carpenter & Associates, Syracuse, N. Y
James M. Caird, Troy, N. Y.
E. S. Draper, Charlotte, N. C.
Gilbert C. White Co., Durham, N. C.
B. Ashburton Tripp, Cleveland, Ohio.
Geo. B. Gascoigne, Cleveland, Ohio
R. Husselman, Cleveland, Ohio
Wilbur Watson & Asso., Cleveland, Ohio
Jones & Carr Co., Cleveland, Ohio
Randall & Co., R. H., Toledo, O.
Boulay-Harrison Co., Toledo, Ohio
Hill & Hill, Erie, Pa.
Ledoux, J. W., Philadelphia, Pa.
Seofield Engineering Co., Philadelphia, Pa.
J. N. Chester Engineers, Pittsburgh, Pa.
Morris Knowles, Pittsburgh, Pa.
P. B. Leopold, Pittsburgh, Pa.
W. E. Fuller, Swarthmore, Pa.
Edwin Wortham, Richmond, Va.

Rates and Finance
John Bauer

Railroads
J. C. Brackenridge

Gas Investigations
B. Cohen

Street Railways and Buses
Walter Jackson

AMERICAN PUBLIC UTILITIES BUREAU

50 MADISON AVE. NEW YORK CITY

William Wagner, Executive Secretary

Send for Folder A, describing our "Cooperative Public Utility Service" and our organization for more effective assistance to municipalities on questions of finance, rates, service and other utility problems.

Water and Sanitation
George A. Johnson

Electric Light and Power
Lamar Lyndon

Telephones
Manfred K. Teeppen

Accounting
Mark Wolff, C. P. A.

AIRMAP CORPORATION of AMERICA

An Engineering Service for Engineers by Engineers

The AIRMAP—The Engineer's Aerial Map for City Planning, Zoning, Water Supply Studies, Tax Purposes, Developments.

Aerial Photography in All Its Phases.

Sperry Bldg. Brooklyn, N. Y.

ALBRIGHT & MEBUS

Consulting Engineers

WATER SUPPLY — SEWAGE DISPOSAL — TOWN PLANNING

Municipal Engineering, Sewerage, Drainage, Refuse Disposal, Street Paving, Valuation, Reports, Design and Construction.

1502 LOCUST STREET PHILADELPHIA, PA.

BLACK, McKENNEY & STEWART

Member American Society of Civil Engineers

1653 Pennsylvania Ave., N. W., Washington, D. C.

CONSULTING ENGINEERS

CHAS. A. McKENNEY Maj. Gen. W. M. BLACK, U. S. A., Retired JOHN STEWART

MUNICIPAL, HIGHWAY, RIVER, HARBOR, PORT AND TERMINAL ENGINEERING

Examinations, Reports, Designs, Estimates, Organization and Administration

Alvord, Burdick & Howson
John W. Alvord Chas. B. Burdick
Louis R. Howson
ENGINEERS for
Water Works — Sewage Disposal
Water Purification — Drainage
Flood Relief — Appraisals
Sewerage — Power Generation
CHICAGO — HARTFORD BLDG.

AMERICAN PARK BUILDERS
Landscape Architects and City Planners
Comprehensive city planning. Zoning. Land Plotting.
201 E. Ontario St., Chicago, Ill.

E. T. ARCHER & CO.
Consulting Engineers
Steam & Hydraulic Power Plants, Water, Sewerage, Paving, Roads, Appraisals, Testimony, Reports.
New England Bldg. Kansas City, Mo. — City Bank Bldg. Shreveport, La.

BANKS & CRAIG
51 East 42nd St., New York City
State Chamber of Commerce Bldg. Harrisburg, Pa.
Municipal, hydraulic and sanitary engineers.
Design, operation, valuation.

THE BEELER ORGANIZATION
Operating, Traction and Traffic Investigations. Routing Surveys. Valuations, Operation, Management.
52 Vanderbilt Avenue, New York

Benham Engineering Co.
CONSULTING ENGINEERS
Water Works, Sewerage, Electric Light and Power, Pavements, Reports and Appraisals
GUMBEL BLDG. KANSAS CITY MO.

J. ROWLAND BIBBINS
Transportation-Consultant
2301 Connecticut Ave. Washington, D. C.
Surveys Organized—Traffic Plans.
Transit and Routing Improvements. Motor-Transport, Railroad and Port-Terminal Development. Valuations.
Coordination with the City Plan.
Experience in 83 Cities.

Kansas City Mo. — Mutual Bldg.
BLACK & VEATCH
CONSULTING ENGINEERS
Sewerage, Sewage Disposal, Water Supply, Water Purification, Electric Lighting, Power Plants, Valuations, Special Investigations and Reports.

Arthur H. Blanchard
M. Am. Soc. C. E. *M. E. Inst. Con.*
Highway Transport Consultant
Traffic Control Expert
Consulting Highway Engineer
1026 East Engineering Building
Ann Arbor, Mich.

BOULAY-HARRISON CO.
Civil Engineers
TOLEDO — OHIO
912½ Broadway
Sewerage, Sewage Disposal, Water Supply, Water Filtration
Pavements, Reports

THOMAS F. BOWE
Consulting Engineer
Designs — Water, Sewerage,
Valuations — Treatment of
Inspections — Sewage
Reports — Industrial Plants
110 William Street, New York City

CHAS. BROSSMAN
Mem. Am. Soc. C. E., Mem. Am. Soc., M. E.
Consulting Engineer
Reports, Investigation Plans, Specifications, Water Supply, Sewerage and Disposal, Lighting Plants—Supervision of Construction and Reduction in Operating Cost. Appraisals—Expert Testimony.
New Chamber of Commerce Bldg.
Indianapolis, Ind.

PARKS
Old parks redesigned; New areas located and planned to benefit traffic, school and housing conditions.
GEORGE BURNAP
Washington, D. C.

Burns & McDonnell Engineering Co.
McDonnell-Smith-Baldwin-Lambert
Consulting Engineers
Waterworks, Sewerage, Lighting, Appraisals, Rate Investigations.
Kansas City, Mo., Interstate Bldg.
Los Angeles, Cal., West. Pacific Bldg.

JAMES M. CAIRD
Assoc. Am. Soc. C. E.
CHEMIST and BACTERIOLOGIST
OFFICE AND LABORATORY
92 FOURTH ST. TROY, N. Y.
Water Analysis and Tests of Filter Plants

THE J. N. CHESTER ENGINEERS
J. N. Chester D. E. Davis J. F. Laboon
J. T. Campbell E. E. Bankson
Water Works, Water Purification, Rate Investigations and Appraisements, Sewerage, Sewage Disposal, Operation of Properties, Expert Testimony.
Union Bank Bldg. Pittsburgh, Pa.

CHICAGO LANDSCAPE COMPANY
Landscape Architects and Contractors
79 West Monroe Street, Chicago

Chicago Paving Laboratory
L. Kirschbraun — Hugh W. Skidmore
Gene Abson
Consulting and Inspecting Engineers
PAVEMENTS AND MATERIALS
Consultation — Inspection — Specifications
Testing — Investigation — Design
Research
536 Lake Shore Drive Chicago, Ill.

City-Wastes Disposal Co.
Specialists in Drainage, Sewerage and Sewage Disposal.
Reports and Estimates. Surveys, Plan and Supervision.
New York, 45 Seventh Avenue

H. BURDETT CLEVELAND
Consulting Sanitary Engineer
Associated with
CORNELIUS C. VERMEULE
Consulting Engineer
Sanitary Investigations and Reports, Design and Supervision, Water Supply, Water Purification, Sewerage and Sewage Disposal.
New York 38 Park Row

14 E. Jackson Blvd., Chicago
Studio: Glenview, Illinois
LOUIS S. COLE
Landscape Architect and City Plan Consultant
Zoning & Zoning Ordinances, Land Subdivisions, Park, Cemeteries.

W. R. Conard — J. B. Buzby
CONARD & BUZBY
BURLINGTON, N. J.
Specialists on Water Works—
Materials — **Inspections** — **Designs**
Specifications — **Reports** — **Tests**

CONDRON & POST
Theo. L. Condron Chester L. Post
CIVIL ENGINEERS
Bridges Buildings, Foundations
Monadnock Building
CHICAGO
Telephone: Harrison 0069

JOHN A. FOULKS
CONSULTING ENGINEER
18-20 Beaver St. Newark, N. J.
Specialist in Municipa Engineering and Public Improvements, including Organization, Management, Investigations, Reports, Plans, Estimates, Specifications and Supervision.

HAZEN & WHIPPLE
CONSULTING HYDRAULIC and SANITARY ENGINEERS
WATER SUPPLY and SEWERAGE
Allen Hazen Malcolm Pirnie
C. M. Everett L. N. Babbitt
26 W. 44th Street, New York

JACOB L. CRANE, JR.
Municipal Development Engineer
CITY AND TOWN PLANNING—ZONING
Municipal Utilities
Land Subdivision Housing
Wrigley Building 400 N. Michigan Ave.
CHICAGO

WESTON E. FULLER
Weston E. Fuller Errol W. Doebler
CONSULTING ENGINEERS
Water Works, Sewerage Works, Flood Control, Drainage, Supervision of Constructions and Operation, Rates, Valuation.
SWARTHMORE, PENNA.

J. WALLACE HIGGINS
Assoc. M. Am. Soc. C. E.
CIVIL AND LANDSCAPE ENGINEER
Municipal Engineering, Sewerage, Parks, Cemeteries, Subdivisions, Topographic Surveys, Title Surveys, Estimates, Supervision.
100 East 45th St. NEW YORK

Member Amer. Society Landscape Architects
E. S. DRAPER
Landscape Architect and Engineer
Charlotte, N. C. Atlanta, Ga.

Gascoigne, George B.
Consulting Sanitary Engineer
W. L. Havens A. A. Burger
F. W. Jones F. C. Tolles
Sewerage and Sewage Disposal
Water Supply and Purification
Treatment of Industrial Wastes.
Cleveland, Leader-News Building

HILL & HILL ERIE, PA.
Sanitary and Municipal Engineers
Sewage Disposal Plants
Water Filtration Plants
Water and Sewer Systems
Design—Supervision—Inspection

F. A. Dunham
Municipal Engineering
Roads, Pavements, Sewers and Supervision. Also Surveys, Developments, Topography and Land Subdivision.
109 Park Ave. Tel. 610
PLAINFIELD, N. J.

New York City 116 West 39th St.
A. E. HANSEN
Hydraulic & Sanitary Engineer
Design & Supervision of Construction
Sewerage Water Works
Sewage Disposal Water Purification
Drainage Water Works Valuation
Expert Services in Litigation

CHARLES C. HOPKINS
CONSULTING ENGINEER
349 Cutler Bldg., Rochester, N. Y.
Water supply and purification. Sewerage, Wastes disposal. Municipal Engineering, Expert testimony and appraisals. Plans, estimates, supervision.

Fay, Spofford & Thorndike
Consulting Engineers
Investigations Reports Designs
Engineering Supervision Valuations
Port Developments Bridges
Water and Sewerage Systems
44 SCHOOL STREET, BOSTON

James C. Harding,
Consulting Engineer and Sanitary Expert.
Water Supply and Purification. Refuse Disposal. Sewerage and Sewage Disposal. Investigations of Epidemics. Water Works Valuations. Supervision of Construction and Operation.
New York City. 170 Broadway

Wm. D. Hudson Company
Consulting Engineers
Grade Crossing Elimination
Investigation, Plans and Estimates of Cost,
919 Louderman Building, St. Louis, Mo.
Affiliated with Harland Bartholomew and Associates.

Inspections - Tests - Specifications - Reports
Walter H. Flood & Co.
Chemical Engineers
PAVING AND ENGINEERING MATERIALS
932 E. 44th St. Chicago, Ill.
321 Daniel B'ldg. Jackson, Miss.

HASKINS & CRAWFORD
C. A. Haskins H. W. Crawford
R. O. Ruble
Consulting Engineers
Civil Sanitary Hydraulic
1007 Baltimore Ave.,
Kansas City, Mo.

R. HUSSELMAN
CONSULTING ENGINEER
Design and Construction of Power Stations and Lighting Systems. Appraisals, Estimates and Specifications. Appraisals and Rate Investigations. Electric, Gas and Street Railway.
Cuyahoga Bldg., Cleveland, O.

FAIRCHILD AERIAL SURVEYS, INC.
An organization of specialized engineers, photographers and aviators, assisting municipal executives in practical application of aerial photography *to their needs*
FAIRCHILD SYSTEM TAX MAPS PERMIT REDUCTIONS IN TAX RATES WITH ACTUAL INCREASE IN GROSS REVENUES.
270 West 38th Street New York City

FULLER & McCLINTOCK
ENGINEERS
NEW YORK, - - 170 BROADWAY
PHILADELPHIA, PA., 1001 Chestnut St. TOLEDO, OHIO, 352 Summit-Cherry Bldg.
KANSAS CITY, MO., 600 Walnut Street
WEST PALM BEACH, FLA., Room 2, Realty Bldg., 115½ So. Poinsettia St.

IVES & STERN
Consulting Mechanical Engineers
Subway gates, Locks, Fire doors, Safety devices, Traffic signalling, Investigations, Reports, Inspections, Estimates.
28 East Jackson Blvd., Chicago, Ill.

Chas. W. Leavitt & Son
Civil and Landscape Engineering
City Planning
285 Madison Ave.
NEW YORK CITY

METCALF & EDDY
14 Beacon St. Boston, Mass.
CONSULTING ENGINEERS
Water Works. Sewerage Works. Industrial Wastes. Municipal Refuse. Drainage. Flood Protection. Supervision of Construction and Operation. Valuations. Laboratory for Chemical and Biological Analyses.

WALTER JACKSON
Fare and Motor-Bus Consultant
143 Crary Avenue
Mt. Vernon New York

LEDOUX, J. W.,
Consulting Engineer
Water Works Water Power
Power Plants
Reports, Designs, Construction Supervision, Valuation, Arbitration, Rate Schedules.
112 N. Broad St., Phila., Pa.

RUDOLPH P. MILLER
Consulting Engineer
Building Laws, Zoning, Building Construction, Fire Protection
342 Madison Ave. New York City

GEORGE A. JOHNSON
CONSULTING ENGINEER
Water Supply and Purification, Sewerage and Sewage Disposal, Refuse Collection and Disposal.
150 Nassau Street, NEW YORK

Alex. S. Lynch John F. Lynch
Members Am. Soc. of C. E.
LYNCH BROTHERS
Consulting Civil Engineers
Designers and Builders of Swimming Pools
Box 283 New Haven, Conn.

Arthur L. Mullergren
Consulting Engineer
Specialist in
Electric Light, Power and Water Pumping
770 BOARD OF TRADE BLDG.
KANSAS CITY, MO.

THE JONES & CARR CO.
Consulting Engineers
Prospect-Fourth Bldg., Cleveland, O.
Specialists on Street Lighting For Municipalities.
Examinations and Reports, Appraisals and Adjustments of Rates. Plans and Specifications. Estimates.

MANN & MAC NEILLE
Architects and City Planners
70 East 45th Street
New York

J. FRENCH PADDOCK AND ASSOCIATES
Civil and Landscape Engineers
Harry L. Hudson, Civil Engineer — J. French Paddock, Landscape Engineer
Water Works, Water Purification, Sewerage, Sewage Disposal, Pavements, Investigations, Reports, Designs, Supervision, Inspection, City Planning, Parks, Townsites, Resort Projects, Subdivisions.
Suite 507 Fine Arts Bldg., Detroit, Michigan.

KELKER, DE LEUW & CO.
Consulting Engineers
111 W. Washington St., Chicago, Ill.
Transportation Studies, Traffic Reports for Cities

CYRIL E. MARSHALL
M. Am. Soc. C. E.
Consulting Engineer
Hempstead, N. Y.
Water Supply — Town Planning
Sewerage — Pavements
Garbage Disposal — Drainage

Pearse, Greeley & Hansen
Hydraulic & Sanitary Engineers
Reports, Designs, Supervision, Appraisals, Water Supply, Sewerage, Water Purification, Sewage Treatment, Refuse Disposal.
Chicago, Ill., 6 N. Michigan Ave.

MORRIS KNOWLES, INC.
Engineers
PITTSBURGH — CLEVELAND
Municipal and Public Utility Engineers, City Planning, Zoning

MAURY & GORDON
Dabney H. Maury
Fred G. Gordon
Consulting Engineers
Water Works — Sewerage
Power Plants — Appraisals
Chicago, Ill., 1445 Monadnock Blk.

PILLSBURY ENGINEERING CO.
Minneapolis Saint Paul
Power Plants, Central Heating Systems, Sewers, Sewage Disposal Waterworks, Paving, Street Illumination, Appraisals, Rate Investigations.

NICHOLAS S. HILL, JR.
CONSULTING ENGINEER
WATER SUPPLY—SEWAGE DISPOSAL—HYDRAULIC DEVELOPMENTS
Reports, Investigations, Valuations, Rates, Design, Construction, Operation, Management, Chemical and Biological Laboratories
112 East 19th Street New York City

F. B. LEOPOLD
CONTRACTOR AND BUILDER OF
MUNICIPAL FILTRATION PLANTS, GRAVITY FILTERS, PRESSURE FILTERS AND WATER SOFTENING PLANTS
HOUSE BUILDING :: :: :: PITTSBURGH, PA., U. S. A.

THE AMERICAN CITY DIRECTORY OF CONSULTANTS

CLARENCE D. POLLOCK
Member Am. Soc. C. E.
Consulting Engineer
Pavements, Highways, Drainage, Sewerage, Town Planning and General Municipal Problems.
Reports, Specifications, Supervision
Park Row Bldg., New York City

Telephone Randolph 1724
Power Plants—Distribution Systems
Street Lighting—Flood Lighting
C. H. SHEPHERD
CONSULTING ENGINEER
Associated with Engineering Service Corp.
719-721 First Nat'nal Bank Bldg.
CHICAGO

G. J. Wagner & Company
Consulting Engineers
Grand Rapids, Mich.
Public Utility and City Management, Construction, Operation, Rates.

Alexander Potter, C. E.
Hydraulic and Sanitary Engineer
50 Church Street
New York
(Hudson Terminal) Tel. Cortlandt 5501

SIBLEY, CARPENTER & Associates
Consulting Engineers — Architects
City Plan Advisers — Statisticians
Traffic Surveys, Municipal Markets, Parks, Landscape Plans, Golf Courses, Cemeteries, Institution Grounds, Industrial Layouts, Appraisals, Expert Testimony
New York — 445 S. Warren St.,
State License — Syracuse, N. Y.

West Suburban Engineering Co.
B. W. HEIPLE, President.
CHAS. M. SCULLIN, Sec'y-Treas.
Municipal Engineers
WESTERN SPRINGS, HINSDALE, CLARENDON HILLS, ILLINOIS
Chicago Ave. & Washington St., Hinsdale, Illinois
Telephone, Hinsdale 1011

Clyde Potts
30 CHURCH ST., NEW YORK
Civil and Sanitary Engineer
Sewerage and Sewage Disposal Works, Hydraulics, Water Works, Filtration, Reports, Plans and Estimates.

C. E. SMITH & CO.
CONSULTING ENGINEERS
2073 Railway Exch. Bldg., St. Louis, Mo.
Investigations, reports, appraisals, expert testimony, bridge and structural work, railway problems, electrification, grade crossing elimination, foundations, highways, docks, water supply, river and flood protection, drainage and sanitation, power plants.

WESTON & SAMPSON
CONSULTING ENGINEERS
Hydraulic and Public Health Engineering.
Engineering and Laboratory Investigations.
Supervision of Purification Plants
14 Beacon Street, Boston, Mass.

R. H. RANDALL & COMPANY
Engineers
TOLEDO, OHIO
Geodetic and topographic surveys and maps of large areas. Services rendered include over ninety per cent of American CITY SURVEYS.

THE S. A. SULENTIC CONSULTING ENGINEER COMPANY, INC.
224 New England Bldg. — Topeka, Kansas
Ellsworth, Kansas
Power Plants — Water Works
Electric Lighting — Sewerage System
Heating & Ventilation — Paving
Refrigeration

Gilbert C. White Co.
Consulting Engineers
Waterworks — Streets
Power Plants
DURHAM, N. C.

RANDOLPH - PERKINS CO.
Engineers—Managers
Housing, City Planning, Water Supply and Sewage Disposal.
L. K. Sherman, Pres.
1444 First National Bank Bldg., Chicago

Henry W. Taylor
Water Supply — Sewerage
Hydraulic Developments
149 Broadway, N. Y. City

THOS. H. WIGGIN
CONSULTING ENGINEER
415 Lexington Ave., New York City
Reports, Designs, Supervision, Valuation: Water Supply, Sewerage, Flood Control, Tunnels.

J. F. Sanborn & C. L. Bogert
Consulting Civil Engineers
Reports — Designs
Water Supply — Concrete Structure
Sewerage — Tunnels
30 Church St., New York, N. Y.

B. ASHBURTON TRIPP
LANDSCAPE ARCHITECT
Mem. Am. Soc. of Landscape Architects
Industrial Towns. Subdivisions, Parks, School and Institution Grounds
Guardian Bldg., Cleveland, Ohio

EDWIN WORTHAM
Engineer
Valuations of Public Utilities. Water—Light and Power—Gas—Street Railway—Telephones—Buses, Management Investigations.
Grace-Amer. Bldg., Richmond, Va.

SCOFIELD ENGINEERING CO.
Philadelphia
Consulting Engineers
An organization of thoroughly trained experts with a wide, successful experience in—Public Service Properties, Refrigeration, Industrial and Textile Plants, Municipal Improvements.

Van Trump Testing Laboratory
Paving and Testing Engineers
Isaac Van Trump, A. M. Am. Soc. C. E.
LABORATORIES:
2337 South Pauline St. — 344 Gazette Bldg.
Chicago, Illinois — Little Rock, Arkansas
Paving and Engineering Materials, Chemical and Physical Tests. Inspection and Supervision. Specifications and Consultations. Experts in Paving Litigation.

Barker & Wheeler
Water Supply — Utility and
Sewerage — Industrial
Sewage Disposal — Valuations
Power Systems — Reports
Albany, N. Y., 36 State St.
New York City, 90 West St.
Atlanta, Ga., 47 N. Forsyth St.

PERINE & COMPANY
ACCOUNTANTS AND AUDITORS
Municipal Audits — Accounting Investigations — Systems
We Especially Invite Correspondence with Municipal Heads
Singer Building
149 Broadway
New York City
EXPERIENCED AS ACCOUNTANTS SINCE 1898
Investment Bldg.
15th and K. Sts., N. W.
Washington, D. C.

OVER HALF A CENTURY IN CHICAGO

THE EDGAR A. ROSSITER CO.

CONSULTING ENGINEERS

160 North La Salle St., Chicago

Water supply, sewerage, and sewage disposal, drainage, farm and levee-pumping plants, electric light systems, pavements, track elevation, tunnels, mining.

TECHNICAL ADVISORY CORPORATION

Consulting Engineers

15 Park Row, New York

Specialists in Municipal Engineering

Zoning Plans — Comprehensive City Plans — Street Systems — Traffic Regulation — Grade-crossing Elimination — Industrial Surveys.

UNIVERSAL AUDIT COMPANY

Accountants and Auditors—Industrial Engineers

SINGER BUILDING (Hanover 8374) NEW YORK

Specialists in Municipal Auditing, Accounting, Financing and Related Engineering Problems.

Public Utilities for Public Service

DELOS F. WILCOX, Ph.D

Public Utility Advice from Public Point of View

436 Crescent St., Grand Rapids, Mich.

SPECIALISTS IN ANALYSES

Service-at-Cost Proposal
Public Utility Valuations
Public Ownership Plans
Problems of Public Policy

for **IMPROVED BRASS STREET SIGNS**

also Warning Signals *and* Traffic Markers *for* Every Use

Write for the Catalog of the

UNION IRON PRODUCTS COMPANY

East Chicago Indiana

FOR UNSEWERED DISTRICTS

***San-Equip* SEPTIC TANKS**

City Engineering and Health Departments save time and trouble by specifying these portable septic tanks for installation by the plumber in any unsewered buildings.

Water-tight—rust-proof—unbreakable.

Capacity—single home to large schools or communities.

CHEMICAL TOILET CORPORATION

SYRACUSE -x- NEW YORK

INDEX TO ADVERTISEMENTS IN THIS ISSUE

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

For Directory of Consulting Engineers, Landscape Architects Etc., see pages 140, 141, 142, 143, 144, 145

*Acme Road Machinery Co..... 105
*Ahrens-Fox Fire Engine Co.... 122
*Airmap Corp. of America..... 140
*Albright & Mebus..... 140
Aldrich Pump Co..... 46
*Allis-Chalmers Mfg. Co..... 55
*American Can Co..... 135
American Cast Iron Pipe Co... 5
*American Fence Constr. Co.... 131
*Amer.-La France Fire Eng. Co. 125
Amer. Public Utilities Bureau.. 140
American Steam Pump Co..... 42
American Steel & Wire Co..... 120
American Tel. & Tel. Co..... 60
American Vibrolithic Corp..... 111
*American Well Works..... 53
Anchor Port Iron Works..... 131
Anderson Engine & Fdy. Co... 42
Andorra Nurseries..... 138
*Asphalt Assn., The..... 124
Aurora Pump & Mfg. Co..... 12
*Austin-Western Rd. Mach'y Co. 112
Autocar Co..... 83
*Automatic Signal and Sign Co.. 66

*Badger Meter Mfg. Co..... 27
*Baker Mfg. Co..... 99
Barber Asphalt Co..... 90
Barber-Greene Co..... 96
*Barrett Co..... 85
*Bartlett & Snow Co, C. O..... 17
*Bausman Mfg. Co..... 58
*Bi-Lateral Fire Hose Co..... 120
*Bissell Co., F..... 48
Black, McKenney & Stewart... 140
Bobbink & Atkins..... 138
Bolinders Co., Inc..... 54
Boyer Fire Apparatus Co..... 128
Boyle & White..... 69
Braxmar Co., Inc. C. G..... 122
Breakers Hotel..... 110
Budd Wheel Co..... 91
*Buffalo Meter Co..... 22
*Buffalo-Springfield Roller Co... 110
Butler Mfg. Co., Minneapolis... 139
Butler Mfg. Co., Cleveland.... 93

Casey-Hedges Co..... 56
Cast Iron Pipe Publicity Bureau 15
Caterpillar Tractor Co..... 97
Celite Products Co..... 114
*Central Foundry Co..... 49
Chausse Oil Burner Co..... 122
*Chemical Toilet Corp..... 145
Chevrolet Motor Co..... 82
Chicago Bridge & Iron Wks.... 39
*Chicago Pump Co..... 30
Chipman Chemical Engr. Co... 134
*Clark Co., H. W..... 22
*Clarksville Fdy. & Mach. Wks.. 28
*Clay Products Ass'n..... 52
Cleveland Tractor Co..... 95
Climax Engr. Co..... 43
Clow & Sons, James B..... 34
*Coldwell Lawn Mower Co..... 81
Coldwell-Wilcox Co..... 18
*Columbian Iron Works Co..... 40
Conard & Buzby..... 141
*Connery & Co., Inc..... 116
Continental Motors Corp..... 71
Continental Products Co..... 64
*Cook, Inc., A. D..... 46
*Crouse-Hinds Co..... 65
*Cutter Works, George..... 147

Darling Valve & Mfg. Co..... 18
*Decarie Incinerator Corp..... 12
Dee Co., Wm. E..... 34
De Laval Steam Turbine Co... 52
Dixon Crucible Co., Joseph.... 34
Dobbie Fdy. & Mach. Co..... 46
Donaldson Iron Co..... 26
*Dorr Co..... 11
*Dow Chemical Co..... 115

*Economy Pumping Machy. Co. 26
*Eddy Valve Co..... 32
*Electric Railway Equip. Co.... 62
*Electro Bleaching Gas Co..... 14
Elkhart Foundry & Machine Co. 70
*Ellis & Ford Mfg. Co..... 32
Empire Elec. & Water Co., Inc.. 28
Engineering News-Record..... 78
*Esseo Manufacturing Co..... 67
*Eureka Fire Hose Mfg. Co..... 126
Everhot Mfg. Co..... 116
*Evernu Century Sign Co..... 66
Everson Filter Co..... 34
*Everwear Mfg. Co..... 59

*Fabric Fire Hose Co..... 128
Fairchild Aerial Survey, Inc.... 142
*Federal Meter Corp..... 23
Firestone Tire & Rubber Co.... 84
Fitzhenry-Guptill Co..... 86
*Foamite-Childs Corp..... 129
Forest Nursery Co..... 138
*Ford Meter Box Co..... 21
Framingnam Nurseries..... 139
*Full-Crawler Co..... 99
*Fuller & McClintock..... 142
*Fulton Iron Works Co..... 2

Galion Iron Works & Mfg. Co.. 120
*Gamewell Co..... 88
*Gamon Meter Co..... 20
*General Electric Co..... 63
General Filtration Co..... 34
G-K Sales Agency..... 16
*Goder Incinerator Co..... 18
Godwin Co., W. S..... 139
Goulds Pumps, Inc..... 50
Graham Bros..... 92
*Graver Corp..... 22

*Hadfield-Penfield Co..... 98
Hanson Co., The C. H..... 130
*Harley-Davidson Motor Co.... 127
*Hazard Manufacturing Co..... 68
*Heil Co., The..... 114
*Hersey Manufacturing Co..... 25
Highway Trailer Co..... 108
Hiler Engineering & Constr. Co. 16
*Hill, Nicholas S..... 143
*Hill-Standard Co..... 57
*Honhorst Co., Jos..... 120
*Horni Signal Mfg. Co..... 64
Hotel Martinique..... 104
Hotel Pennsylvania..... 12
*Huber Manufacturing Co..... 116
*Hvass & Co., Inc., Chas..... 105
Hydraulic Development Co.... 44

*Ideal Power Lawn Mower Co... 134
*Independent Concrete Pipe Co. 26
Interflash Signal Corp..... 68
*International Filter Co..... 54
International Harvester Co.... 103
International Steel Tie Co..... 106

Johnson, Inc., Edward E..... 26

Keebler Mfg. Co., H. W..... 66
Kelly-Springfield Tire Co..... 107
Kelly Well Co..... 46
*Kennedy Valve Mfg. Co..... 31
*Kentucky Rock Asphalt Co.... 118
*Keystone Driller Co..... 54
*King Co..... 89
*Kinney Mfg. Co..... 108
Kohankie & Son, Henry..... 138

*Leadite Co., The..... 38
Lead Lined Iron Pipe Co..... 26
*Lecourtenay Co..... 54
Leitelt Bros..... 64
*Leopold, F. B..... 143
Line-O-Graph Co..... 66
*Lithoprint Co. of N. Y..... 139
*Littleford Bros..... 106
*Lock Joint Pipe Co..... 45
*Ludlow Valve Mfg. Co..... 29

*Mack Trucks, Inc..... 122
Maier-Lavaty Corp..... 128
Manierre Engr. & Machy. Co... 123
Manufacturers Appraisal Co.... 87
*Mathieson Alkali Works, Inc... 7
Maxim Silencer Co..... 48
*McIntosh & Seymour Corp.... 9
McNear & Co., C. W..... 130
*McWane Cast Iron Pipe Co.... 51
Meehan Co., Thos. B..... 138
*Michigan Pipe Co..... 18
*Michigan Valve & Fdy. Co.... 28
*Mitchell Manufacturing Co.... 58
Mueller Co..... 13

*National Cast Iron Pipe Co.... 42
*National Meter Co..... 19
Nat'l Paving Brick Mfrs. Ass'n. 113
*Nat'l Water Main Cleaning Co. 14
Nelson Iron Works, N. P..... 94
*Neptune Meter Co..... 75-76
*Newark Concrete Pipe Co..... 34
*Newport Culvert Co..... 121
*Nordberg Manufacturing Co... 35
*Norwood Engineering Co..... 20
*Novo Engine Co..... 24

Otto & Son Nursery Co., J..... 139
Oxford University Press..... 134

*Pacific Flush-Tank Co..... 16
*Penna. Lawn Mower Works, Inc. 74
Perine & Co..... 144
Pipe Railing Construction Co... 138
*Pitometer Co., The..... 137
*Pittsburgh-DesMoinesSteelCo.18-33
*Pittsburgh Meter Co..... 24
Pittsburgh Testing Laboratory.. 136
*Pole & Tube Works, Inc..... 136
Pontiac Nurseries..... 139
Pope Equipment Co..... 104
Portland Cement Ass'n..... 119

Rex-Watson Corp..... 120
Roberts Filter Mfg. Co..... 16
Rochester Can Co..... 133
*Rochester Street Signal Co..... 66
Rome Mfg. Co..... 73
*Rossiter Co., Edgar A..... 145
Royal Palace Hotel..... 112
Rundle-Spence Mfg. Co..... 56
*Russell Grader Mfg. Co..... 110

*Sanitation Corporation..... 30
S. E. T. Valve & Hydrant Co... 28
*Servicised Products Co..... 117
Signal Automatic Co.....101-102
*Simplex Valve & Meter Co..... 30
Simplex Wire & Cable Co..... 70
*Smith Mfg. Co., A. P..... 32
Smith Co., W. & T..... 138
*Solvay Process Co..... 109
Standard Oil Co. of Indiana.... 77
Sterling Engine Co..... 44
*Stewart Iron Works Co..... 131
Storrs & Harrison Co..... 139
*Sullivan Machy Co..... 22

Tarrant Mfg Co..... 130
*Technical Advisory Corp..... 145
*Texas Company.....36-37
Thaleg & Hock..... 104
*Thomson Meter Corp..... 24
*Tokheim Oil Tank & Pump Co. 61
*Truscon Steel Co..... 80
*Tropical Paint & Oil Co..... 64
*Turbine Sewer Mach. Co..... 50

*Union Iron Products Co..... 145
*Union Metal Mfg. Co..... 72
*Union Water Meter Co..... 20
United Iron Works, Inc..... 26
*Universal Audit Co..... 145
Universal Power Shovel Co.... 106
*U. S. Cast Iron Pipe & Fdy. Co..3-47

Van Gilder Water Meter Co.... 24

*Wallace & Tiernan Co., Inc.... 148
Wamblu Corp..... 56
*Waterous Fire Engine Wks., Inc. 40
Warren Foundry & Pipe Co.... 50
Wehr Company..... 28
*Westinghouse Elec. & Mfg. Co.. 147
*White Company..... 100
*Whitehead & Kales Co..... 136
Wilcox, Delos F..... 145
*Wood & Co., R. D..... 41
Wood Hydr. Hoist & Body Co.. 110

*Yeomans Brothers Co..... 48

THE MUNICIPAL INDEX FOR 1926

In addition to the advertising messages which will be found in this issue of THE AMERICAN CITY on the pages as indicated above, condensed catalogs of those marked* will be found in THE MUNICIPAL INDEX for 1926.

What Do Strangers Think *of Your Town?*

Gothic Lighting Standard
with
Large Washington Lighting Unit

HOW many of them carry away good impressions? Adequate — scientific — street lighting is a mighty factor in creating a *favorable* impression —at night—and in furthering civic progress and growth.

Westinghouse ornamental standards add attractiveness to street lighting. They are slender, graceful, artistic. The Gothic —one of the newer designs—is shown at the left.

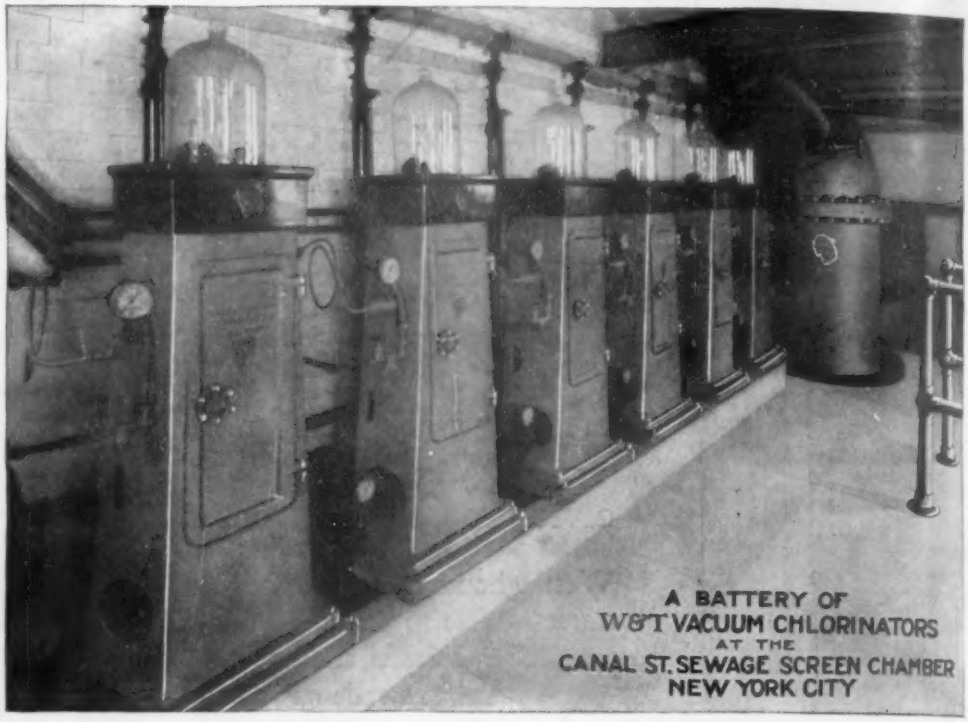
Communities all over the country have installed Westinghouse street lighting—it makes a favorable impression on strangers and appeals to the pride of the home folks.

Westinghouse Electric & Mfg. Company
George Cutter Works South Bend, Indiana
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

X90178

Ornamental Street Lighting



A BATTERY OF
W&T VACUUM CHLORINATORS
AT THE
CANAL ST. SEWAGE SCREEN CHAMBER
NEW YORK CITY

The W & T Vacuum Chlorinator

LONG LIFE
The first vacuum chlorinator is still in operation.

ACCURATE
Indicates the true chlorine flow —average error negligible.

SIMPLE
No diaphragm valves on the chlorine supply.

LEAK PROOF
Any leak would be *into* the apparatus—because of the vacuum.

NON-CORRODIBLE
Silver—platinum—glass—hard rubber—nothing else comes in contact with wet chlorine.

VISIBLE CONTROL
The glass bell jar lets you see what is going on.

LOW UP-KEEP
Averages less than 1% per year.

EFFICIENT
The vacuum completely empties the chlorine cylinders.

Write for Technical Publication No. 38N

"The only safe water is sterilized water"

WALLACE & TIERNAN
INCORPORATED
NEWARK - NEW JERSEY

NEW YORK CHICAGO KNOXVILLE SAN FRANCISCO MINNEAPOLIS PITTSBURGH DALLAS KANSAS CITY
SEATTLE ST. LOUIS BUFFALO HARRISBURG BOSTON INDIANAPOLIS CORTLAND, N. Y.
WALLACE & TIERNAN, LTD., TORONTO, CANADA

S13